MDS-503

SERVICE MANUAL

US Model
Canadian Model
AEP Model
UK Model

Model Name Using Similar Mechanism	MDS-302
MD Mechanism Type	MDM-2A
Base Unit Type	MBU-2
Optical Pick-up Block Type	KMS-210A/J-N

SPECIFICATIONS

System	MiniDisc digital audio system
Disc	MiniDisc
Laser	Semiconductor laser (λ=780 nm) Emission duration: continuous
Laser output power	Less than 44.6 μW* * This output is the value measured at a distance of 200 mm from the objective lens surface on the optical pick-up block with 7 mm aperture.
Laser diode properties	Material: GaAlAs
Revolutions (CLV)	400 rpm to 900 rpm
Error correction	Advanced Cross Interleave Reed Solomon Code (ACIRC)
Sampling frequency	44.1 kHz
Modulation system	EFM (Eight-to-Fourteen Modulation)
Number of channels	2 stereo channels
Frequency response	5 to 20,000 Hz ±0.5 dB
Signal-to-noise ratio (during playback)	Over 98 dB
Wow and flutter	Below measurable limit

Inputs

	Jack type	Input impedance	Rated input	Minimum input
LINE (ANALOG) IN	Phono jacks	47 kilohms	500 mVrms	125 mVrms
DIGITAL OPTICAL IN	Square optical connector jack	Optical wave lenghth 660 nm	—	—
DIGITAL COAXIAL IN	Phono jack	75 ohms	0.5 Vp-p, ±20%	—

Outputs

	Jack type	Rated output	Load impedance
PHONES	Stereo phone jack	10 mW	32 ohms
LINE (ANALOG) OUT	Phono jacks	2 Vrms (at 50 kilohms)	Over 10 kilohms
DIGITAL OPTICAL OUT	Square optical connector jack	−18 dBm	Wave length: 660 nm

— Continued on next page —

MICROFILM

MINIDISC DECK

SONY®

General

Power requirements

Where purchased	Power requirements
Continental Europe	220 - 230 V AC, 50/60 Hz
UK	220 - 240 V AC, 50/60 Hz
U.S. Canada	120 V AC, 60 Hz

Power consumption

Where purchased	Power consumption
Continental Europe and UK	20 W
U.S. Canada	19 W

Dimensions (approx) (w/h/d) incl. projecting parts
UK model: 430 × 97.5 × 303 mm
Other models: 430 × 97.5 × 292 mm
(17 × 3 7/8 × 11 1/2 in.)

Mass (approx) 3.6 kg (7 lbs 15 oz)

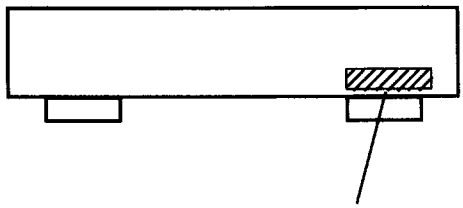
Supplied accessories
- Audio connecting cords (2)
- Optical cable (1)
- Remote commander (remote) (1)
  RM-D5M
- Sony SUM-3 (NS) batteries (2)

Optional accessories
Recordable MDs: MDW-60 (60 min), MDW-74 (74 min)
Optical cable : POC-15A
Coaxial digital connecting cable: VMC-10G

Design and specifications are subject to change without notice.

MODEL IDENTIFICATION

— BACK PANEL —



4-977-999-1□ : AEP, German model
-2□ : UK model
-3□ : US model
-4□ : Canadian model

TABLE OF CONTENTS

The laser component in this product is capable of emitting radiation exceeding the limit for Class 1.

CLASS 1 LASER PRODUCT
LUOKAN 1 LASERLAITE
KLASS 1 LASERAPPARAT

This appliance is classified as a CLASS 1 LASER product. The CLASS 1 LASER PRODUCT MARKING is located on the rear exterior.

The following caution label is located inside of the recorder.

CAUTION	:	INVISIBLE LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM.
ADVARSEL:		USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDS ÆTTELSE FOR STRÅLING.
VARO!	:	AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA LASERSÄTEILYLLE.
VARNING	:	LASERSTRÅLING NÄR DENNA DEL ÄR OPPNÅD OCH SPÄRREN ÄR URXOPPLAD.
ADVERSEL:		USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGÅ EKSPONERING FOR STRÅLEN.

CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Notes on chip component replacement

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

Flexible Circuit Board Repairing

- Keep the temperature of the soldering iron around 270 °C during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:
Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.

2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.

3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

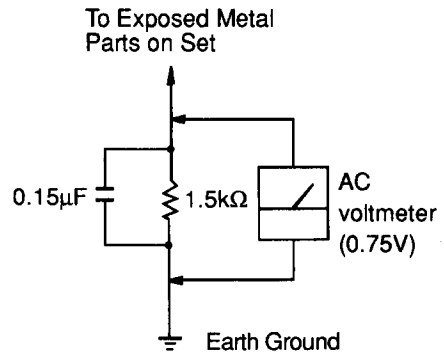


Fig. A. Using an AC voltmeter to check AC leakage.

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

SECTION 1
SERVICE NOTE

[Note for replacement of IC121 and IC171 on the BD board]

IC121 on the BD board of this unit has modified from CXD2535AR to CXD2535BR due to an improvement.
Some contents of nonvolatile memory in the IC171 are modified according to this modification. When replacing IC171, the previous contents for IC121 (CXD2535AR) are written as an initialized value from the system control IC. (When replacing IC171, turn the power on once to write an initialized value.)
In case the IC171 on the BD board is replaced, which uses CXD2535BR to IC121, see the following procedure to rewrite the contents of nonvolatile memory. As for replacement of IC121, use CXD2535BR to rewrite the contents of IC171.

Table Comparison between CXD2535AR and CXD2535BR regarding the contents of nonvolatile memory

ADDRESS	CXD2535AR	CXD2535BR
15	90	93
2D	33	1A
2E	33	1A

- **How to rewrite the nonvolatile memory**

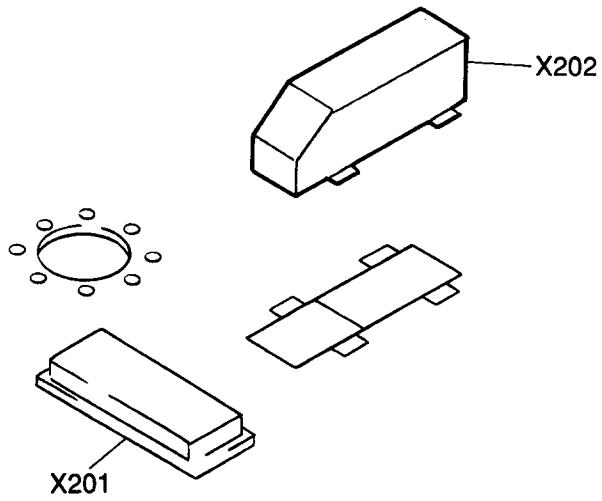
① Plug in the power plug to an outlet pressing the AMS knob, and release the AMS knob.
② Turn the AMS knob to be displayed "EEP MODE".
If the YES button is pressed, the display will be changed to "EEP ** @@".
(** : Address, @@ : data)
③ Turn the AMS knob to be displayed "EEP 15 @@".
④ If the AMS knob is pressed, "EEP 15 @@ > @@" will be displayed. So turn the AMS knob to be displayed "EEP 15 @@ > 93".
⑤ Pressing the YES button, "Complete!" is displayed once, "EEP 15 93" is displayed, and the data is rewritten.
⑥ As for the address 2D and 2E, rewrite each of them to "1A" following the steps ③ to ⑤ as well.
⑦ After the all modification are complete, press the NO button to be displayed "EEP MODE".
⑧ Press the REPEAT button. In case a disc is unloaded, the display "STANDBY" will be go on and off, then unplug the power plug. In case a disc is loaded, "STANDBY" is displayed once and the disc is ejected. After that, unplug the power plug from an outlet to be out from the EEP rewriting mode.
Note : The modification in the contents of nonvolatile memory is not reflected if the power is not turned off once.

[Note for replacement of X202 on the digital board]

The X202 on the digital board has a polarity to the pin. If it is reversed when replacing, it will not operate normally. Refer to the following installation to install.

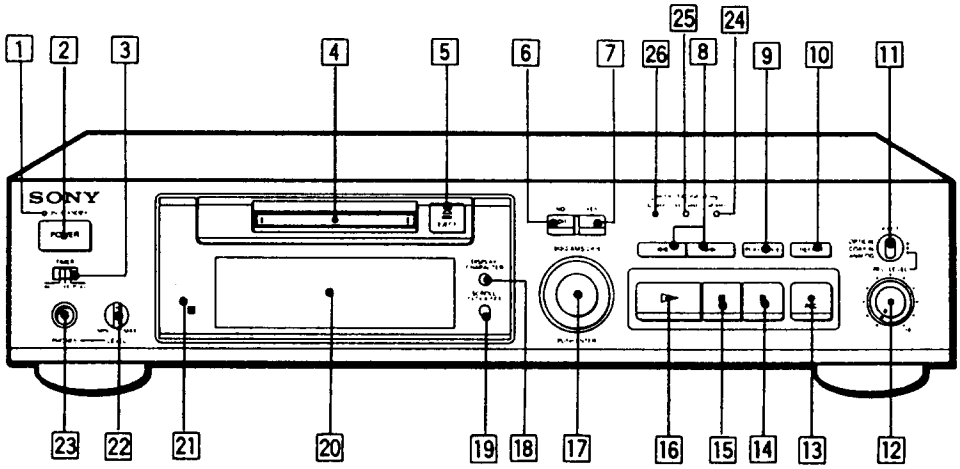
- **How to install**

DIGITAL BOARD (SIDE B)



SECTION 2
GENERAL

FRONT PANEL



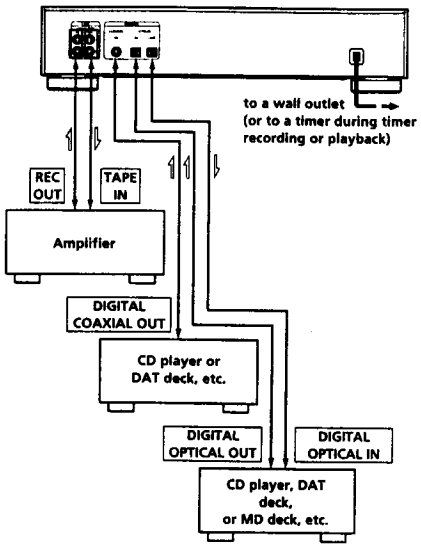
1 ON/STANDBY indicator
2 POWER switch
3 TIMER switch
4 Disc compartment
5 ⏏ EJECT button
6 EDIT NO button
7 EDIT YES button
8 ◀◀/▶▶ (FF/REW) buttons
9 PLAY MODE button
10 REPEAT button
11 INPUT switch
12 REC (record) LEVEL Control
13 ● REC (record) button
14 ■ (stop) button
15 ❚❚ (pause) button
16 ▷ (play) button
17 ⏮ AMS ⏭ knob
18 DISPLAY/CHARACTER button
19 SCROLL/CLOCK SET button
20 Display window
21 Remote sensor
22 PHONES LEVEL control
23 PHONES jack
24 DIGITAL INPUT 48kHz indicator
25 DIGITAL INPUT 44.1kHz indicator
26 DIGITAL INPUT 32kHz indicator

Getting Started

Hooking Up the System

Overview

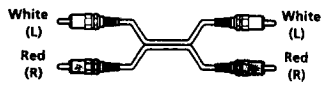
This section describes how to hook up the MD deck to an amplifier or other components such as a CD player or DAT deck. Be sure to turn off the power of each component before connection.



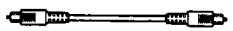
→ : Signal flow

What cords will I need?

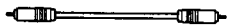
• Audio connecting cords (supplied) (2)



• Optical cable (only one supplied) (2)



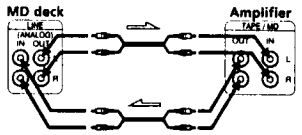
• Coaxial digital connecting cable (not supplied) (1)



Hookups

Connecting the deck to an amplifier

Connect the amplifier to the LINE (ANALOG) IN/OUT jacks using the audio connecting cords (supplied), making sure to match the color-coded cords to the appropriate jacks on the components: red (right) to red and white (left) to white. Be sure to make connections firmly to prevent hum and noise.

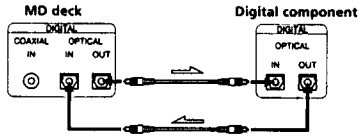


→: Signal flow

Connecting the deck to a digital component such as a CD player, DAT deck, digital amplifier, or another MD deck

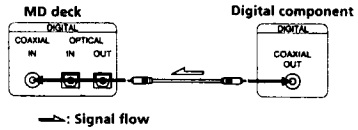
Connect the component through the DIGITAL IN/OUT connectors with two optical cables (only one supplied) or a coaxial digital connecting cable (not supplied). In the case of optical cables, take the caps off the connectors before plugging in the cables.

• **Connecting the optical cables**



→: Signal flow

• **Connecting the coaxial digital connecting cable**



→: Signal flow

Automatic conversion of digital sampling rates during recording

A built-in 20-bit sampling rate converter automatically converts the sampling frequency of various digital sources to the 44.1 kHz sampling rate of your MD deck. This allows you to record sources such as 32- and 48-kHz DAT or satellite broadcasts, as well as compact discs and other MDs.

Notes

- If "Din Unlock" or "Cannot Copy" appears in the display, recording through the digital connector is not possible. In this case, record the program source through the LINE (ANALOG) IN jacks with INPUT set to ANALOG.
- When recording through either of the DIGITAL IN connectors, you cannot adjust the recording level.

Connecting the AC power cord

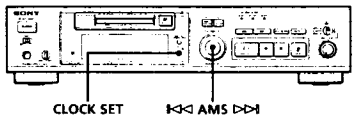
Connect the AC power cord to a wall outlet or to the outlet of a timer.

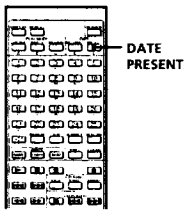
Note

With the exception of a timer outlet, do not connect the AC power cord to a switched outlet.

Setting the Clock

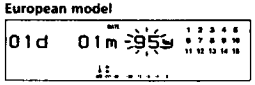
Once you set the MD deck's internal clock, the MD deck will automatically record the date and time of all recordings. When playing a track, you can display the date and time the track was recorded (see page 19).
Time on the European model is displayed in a 24-hour clock.
Time on the Canadian model is displayed in a 12-hour clock.



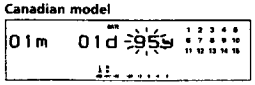


1 With the deck in standby (ON/STANDBY indicator lights up red), press CLOCK SET down for about 2 seconds until the year indication in the display starts flashing.

European model

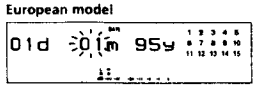


Canadian model

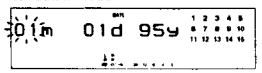


2 Turn AMS to enter the current year, then press AMS.
The year indication stops flashing, and the month indication starts flashing.

European model

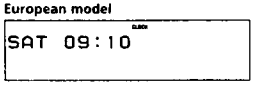


Canadian model

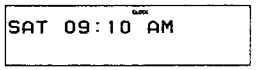


3 Repeat Step 2 to enter the month, day, hour, and minute.

European model



Canadian model



For precise time and date stamping of recordings
Reset the time at least once a week.

Note
If you disconnect the AC power cord for a long time, the memorized settings will disappear, and "STANDBY" will flash in the display the next time you plug in and turn on the deck. If this happens, reset the clock.

Displaying the current date and time

You can display the time even when the deck is on or in standby.

Press DATE PRESENT on the remote.
Each press of the button changes the display as follows:

→ Current display →Date → Time →

If you press the button once, the date and the time appear sequentially for about 2 seconds each, then the current display reappears.
In standby, you can press either DATE PRESENT on the remote or CLOCK SET on the front panel to display the time and the date as described above.

Changing the date and/or time

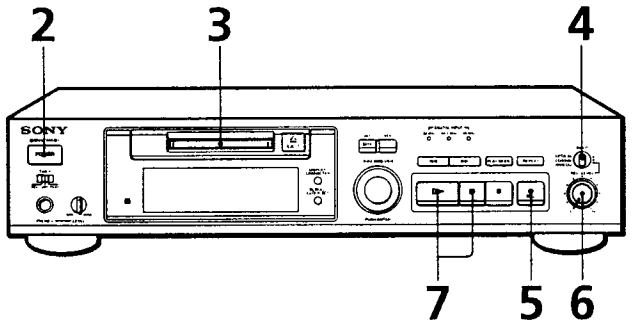
1 With the deck in standby (ON/STANDBY indicator lights up red), press CLOCK SET down for about 2 seconds until the year indication in the display starts flashing.

2 Press AMS repeatedly until the item you want to change flashes.

3 Turn AMS to change the contents of the selected item.

4 To complete the setting, press AMS repeatedly until all items stop flashing.

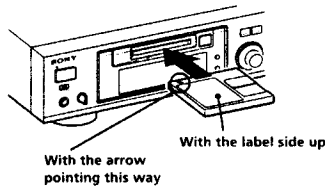
Recording on an MD



1 Turn on the amplifier and play the program source you want to record.

2 Press POWER.
The ON/STANDBY indicator changes from red to green.

3 Insert a recordable MD.



If the MD has a recorded material on it, the deck will automatically start recording from the end of the last recorded track.

4 Set INPUT to the corresponding input connector.

To record through	Set INPUT to
DIGITAL OPTICAL IN	OPTICAL
DIGITAL COAXIAL IN	COAXIAL
LINE (ANALOG) IN	ANALOG

5 Press ● REC.

The deck becomes ready to record.

6 When recording the analog input signal, adjust the recording level with REC LEVEL.

The fourth dot is satisfactory for most purposes. For details, refer to "Adjusting the Recording Level" on page 13.

7 Press ▷ or ❚❚.

Recording starts.

8 Start playing the program source.

When "TOC" flashes in the display

The deck is currently updating the Table Of Contents (TOC).
Do not move the deck or pull out the AC power cord . Changes to an MD made through recording are saved only when you update the TOC by ejecting the MD or changing the deck to standby by pressing POWER.

Do not disconnect the deck from the power source immediately after recording

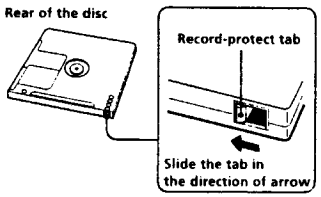
If you do, recorded material may not be saved to the MD. To save the material, after recording, press ⏏ EJECT to take out the MD or change the deck to standby by pressing POWER. "TOC" will flash in the display at this time. After "TOC" stops flashing and goes out, you can pull out the AC power cord.

To	Press
Stop recording	■
Pause recording*	❚❚. Press the button again or press ▷ to resume recording.
Take out the MD	⏏ EJECT after stopping recording

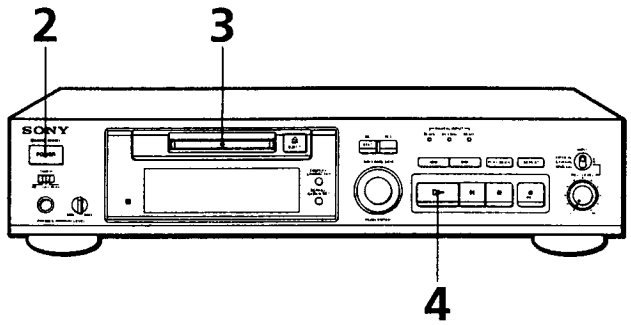
* Whenever you pause recording, the track number increases by one. For example, if you paused recording while recording on track 4, the track number increases by one and recording continues on the new track when restarted.

To protect an MD against accidental erasure

To make it impossible to record on an MD, slide the tab in the direction of arrow, opening the slot. To allow recording, close the slot.



Playing an MD

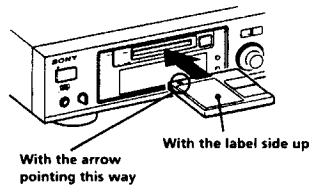


1 Turn on the amplifier and set the source selector to the position for MD deck.

2 Press POWER.

The ON/STANDBY indicator changes from red to green.

3 Insert an MD.



4 Press ▷

The deck starts playing. Adjust the volume on the amplifier.

You can locate and play back a track while the deck is stopped

1 Turn AMS (or press ⏮ or ⏭) until the number of the track you want to play appears.
2 Press AMS or ▷.

To use headphones

Connect them to PHONES jack. Use PHONE LEVEL to adjust the volume.

To	Do the following:
Stop playing	Press ■.
Pause playing	Press ❚❚. Press the button again or press ▷ to resume playing.
Go to the next track	Turn AMS clockwise (or press ⏭ on the remote).
Go to the preceding track	Turn AMS counterclockwise (or press ⏮ on the remote).
Take out the MD	Press ⏏ EJECT after stopping playing.

Notes on Recording

If "Protected" appears in the display
The MD is record-protected. Close the slot to record on the disc (see "To protect an MD against accidental erasure" on page 9).

If "Din Unlock" flashes in the display
- The program source is not connected to the respective digital input connector even though you've selected a digital input source in Step 4 on page 8. To continue, connect the respective digital input connector to the program source or set INPUT to ANALOG to record through LINE (ANALOG) IN.
- The digital signal has been interrupted (stopped) while you were recording. To continue recording, restart the digital program source. To stop recording, press ■ on the MD deck.

Depending on source being recorded, track numbers are marked in following ways:
- When recording from a CD or MD with INPUT set to digital input and the source connected through the respective digital input connector:
  The deck automatically marks track numbers in the same sequence as the original. If, however, a track is repeated two or more times (e.g. by single-track repeat play) or two or more tracks with the same track number (e.g. from different MDs or CDs) are played, the track or tracks are recorded as part of a single, continuous track with a single track number.
  If the source is an MD, track numbers may not be marked for tracks of less than 4 seconds.
- When recording from source connected through LINE (ANALOG) IN with INPUT at ANALOG, and "LEVEL SYNC" does not light up (see "Marking Track Numbers While Recording" on page 14) or when recording from DAT or satellite broadcasts connected through a digital input cable with INPUT set to digital input:
  The source will be recorded as a single track. You can divide the track afterwards using the Divide Function (see "Dividing Recorded Tracks" on page 26) or mark track numbers during recording by using the Track Marking Function on page 14.
  If "LEVEL SYNC" appears in the display, the deck automatically marks track numbers when recording analog source or digital recording of DAT or satellite broadcasts (see "Marking track numbers automatically" on page 14).
- When recording from DAT or satellite broadcasts with INPUT set to digital input, the deck automatically marks a track number whenever the sampling frequency of the input signal changes.

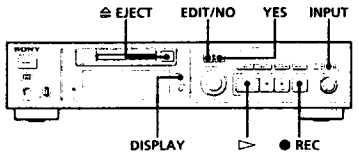
When "TOC" flashes in the display
The deck is currently updating the Table Of Contents (TOC). Do not move the deck or pull out the AC power cord. Changes to an MD made through recording are saved only when you update the TOC by ejecting the MD or changing the deck to standby by pressing POWER.

The MD deck uses the SCMS (Serial Copy Management System on page 34)
MDs recorded through digital input connector cannot be copied onto other MDs or DAT tapes through the digital output connector.

When recording digital signals that have been emphasized (in the higher frequencies)
The signal is automatically de-emphasized (with attenuation proportional to the degree of emphasis) and the level of the de-emphasized signal is indicated on the peak level meters.

Sampling rate of digital signals
When the deck is recording or in recording pause, digital signals input through DIGITAL OPTICAL IN or COAXIAL IN are output to DIGITAL OPTICAL OUT with the same sampling rate.
To change the digital input signal to another sampling rate for output (without recording it to an MD), use Input Monitor Function (see page 12).

Useful Tips for Recording



Checking the remaining recordable time on the MD

- When you press DISPLAY while recording, the remaining recordable time on the MD appears.
- When you press DISPLAY repeatedly while the deck is stopped, the display changes as follows: total recorded time, remaining recordable time on the MD, disc name (see page 18).

Monitoring the input signal (Input Monitor)

Before starting recording, you can monitor the selected input signal through the deck's output connectors.

1 Press ⏏EJECT to remove the MD.

2 Set INPUT according to the input signal you want to monitor.

When INPUT is at ANALOG
The analog signal input through LINE (ANALOG) IN is output to DIGITAL OPTICAL OUT after A/D conversion, and then to the LINE (ANALOG) OUT connectors and PHONES jack after D/A conversion.

When INPUT is at OPTICAL or COAXIAL
The digital signal input through DIGITAL OPTICAL IN or COAXIAL IN is output to DIGITAL OPTICAL OUT after passing through the sampling rate converter, and then to the LINE (ANALOG) OUT connectors and PHONES jack after D/A conversion. Depending on the input signal, one of the DIGITAL INPUT indicators (32 kHz, 44.1 kHz, or 48 kHz) lights up.

3 Press ● REC.
If the input signal is analog, "AD-DA" appears in the display.
If the input signal is digital, "-DA"appears in the display.

If "Auto Cut" appears in the display (Auto Cut)

There has been no sound input for 30 seconds while INPUT is set to digital input and the source is connected through the respective digital input connector. The 30 seconds of silence are replaced by a blank of about 3 seconds and the deck changes to recording pause.

You can turn off the Auto Cut Function
For details, see "If "Smart Space" appears in the display" below.

If "Smart Space" appears in the display (Smart Space)

There has been an extended silence of 4 to 30 seconds in length when INPUT is set to digital input and the source is connected through the respective digital input connector. The silence is replaced with a blank of about 3 seconds and the deck continues recording.

To turn off the Smart Space Function and Auto Cut Function
1 During recording pause, press EDIT/NO repeatedly until "S. Space ?" appears in the display.
2 Press YES.
3 Press EDIT/NO to display "S. Space OFF."

To turn on the Smart Space Function and Auto Cut Function again
1 During recording pause, press EDIT/NO repeatedly until "S. Space ?" appears in the display.
2 Press YES twice to display "S. Space ON".

Notes
- When you turn off the Smart Space Function, the Auto Cut Function is also turned off automatically.
- The Smart Space Function and Auto Cut Function are factory set to on.
- The Smart Space Function does not affect the order of the track numbers being recorded, even if the blank space occurs in the middle of a track.
- If you turn off the deck or disconnect the AC power cord, the deck will recall the last setting (on or off) of the Smart Space and Auto Cut Functions the next time you turn on the deck.

Playing back tracks just recorded

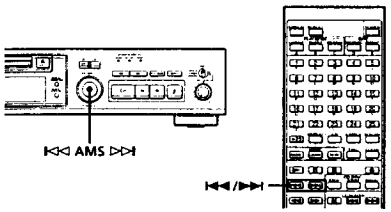
Do this procedure to immediately playback tracks that have just been recorded.

Press ⊳ immediately after stopping recording.
Playback starts from the first track of the material just recorded.

To play from the first track of the MD after recording
1 Press ■ again after stopping recording.
2 Press ⊳.
Playback starts from the first track of the MD.

Recording Over Existing Tracks

Follow the procedure below to record over existing material just as you would on an analog cassette tape.



1 Do Steps 1 to 4 in "Recording on an MD" on page 8.

2 Turn AMS (or press ⏮ or ⏭) until the number of the track to be recorded over appears.

3 To record from the start of the track, continue from Step 5 in "Recording on an MD" on page 9.

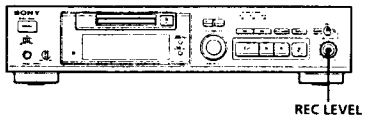
While "TRACK" flashes in the display
The deck is recording over an existing track, and stops flashing when it reaches the end of the recorded portion.

To record from the middle of the track
1 After Step 2 above, press ▷ to start playback.
2 Press ⏸ where you want to start recording.
3 Continue from Step 5 in "Recording on an MD" on page 9.

Note
You cannot record from the middle of an existing track when the "PROGRAM" or "SHUFFLE" is on.

Adjusting the Recording Level

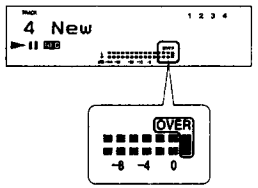
When recording with INPUT at ANALOG and the signal input through LINE (ANALOG) IN jacks, use REC LEVEL to adjust the recording level before starting recording.
You cannot adjust the recording level during digital recording.



1 Do Steps 1 to 5 in "Recording on an MD" on pages 8 and 9.

2 Play the portion of the program source with the strongest signal level.

3 While monitoring the sound, turn REC LEVEL to adjust the recording level so that the peak level meters reach their highest point without turning on the OVER indication. Occasional lighting of "OVER" is acceptable.

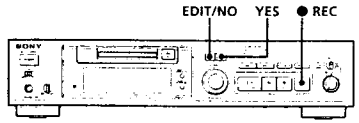


4 Stop playing the program source.

5 To start recording, do the procedure starting from Step 7 in "Recording on an MD" on page 9.

Marking Track Numbers While Recording (Track Marking)

You can mark track numbers either manually or automatically. By marking track numbers at specific points, you can quickly locate the points later using the AMS Function or Editing Functions.



Marking track numbers manually (Manual Track Marking)

You can mark track numbers at any time while recording on an MD.

Press ● REC at the place you want to add a track mark while recording.

Marking track numbers automatically (Automatic Track Marking)

The deck adds track marks differently in the following cases:

- When recording from CDs or MDs with INPUT set to digital input and the source connected through the respective digital input connector:
  The deck marks track numbers automatically. When you record from a CD or MD, the track numbers are marked as they are found on the original.
- When recording with INPUT at ANALOG and the source connected through LINE (ANALOG) IN, or when recording from DAT or satellite broadcasts with INPUT set to digital input and the DAT or satellite broadcasts connected through the respective digital input connector:
  The deck marks a new track number whenever the signal level drops and rises to a certain point* (Automatic Track Marking). If "LEVEL SYNC" does not light up, set the LevelSync to ON as follows:

1 Press EDIT/NO to display "LevelSync ?"during recording or recording pause.

2 Press YES twice to display "LevelSync ON." "LEVEL SYNC" appears in the display.

To cancel Automatic Track Marking
1 Press EDIT/NO during recording or recording pause. "LevelSync ?" appears in the display.
2 Press YES.
3 Press EDIT/NO.
"LevelSyncOFF" appears in the display.

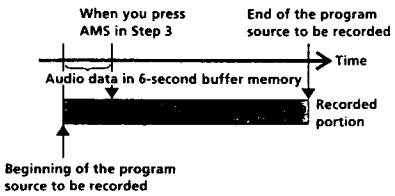
* The signal level must remain low for 2 or more seconds before a new track number is marked.

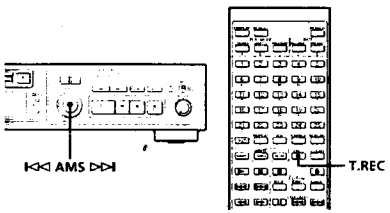
When you want to mark track numbers after you've finished recording
Use the Divide Function (see "Dividing Recorded Tracks" on page 26).

Note
If you turn off the deck or disconnect the AC power cord, the deck will recall the last setting (LevelSync on or off) of the Automatic Track Marking Function the next time you turn on the deck.

Starting Recording With 6 Seconds of Prestored Audio Data (Time Machine Recording)

When recording from an FM or satellite broadcast, the first few seconds of material are often lost due to the time it takes you to ascertain the contents and press the record button. To prevent the loss of this material, the Time Machine Recording Function constantly stores 6 seconds of the most recent audio data in a buffer memory so that when you begin recording the program source, the recording actually begins with the 6 seconds of audio data stored in the buffer memory in advance, as shown in the illustration below:





1 Do Steps 1 to 5 in "Recording on an MD" on pages 8 and 9.
The deck changes to recording pause.

2 Start playing the program source you want to record.
The most recent 6 seconds of audio data is stored in the buffer memory.

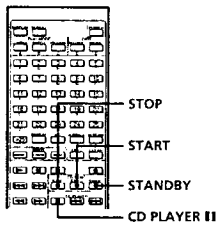
3 Press AMS (or T.REC) to start Time Machine Recording.
Recording of the program source starts with the 6 seconds of audio data stored in the buffer memory.

To stop Time Machine Recording
Press ■

Note
The deck starts storing audio data when the deck is in recording pause and you start playing the program source. With less than 6 seconds of playing of the program source and audio data stored in the buffer memory, Time Machine Recording starts with less than 6 seconds of audio data.

Synchro-Recording With a Sony CD Player

By connecting your deck to a Sony CD player or Hi-Fi Component System, you can easily dub CDs onto MDs using the CD synchro buttons on the remote. If your deck is connected to a Sony CD player by a digital input cable, track numbers are automatically marked as appear on the original regardless of whether "LevelSync ON" or "LevelSyncOFF" is selected. If your deck is connected to a Sony CD player by audio connecting cords through LINE (ANALOG) IN, track numbers are automatically marked when you select "LevelSync ON" (see "Marking Track Numbers While Recording" on page 14).
As the same remote controls both the CD player and the deck, you may have trouble operating both units if they are far from each other. If you do, place the CD player close to this deck.



1 Set the source selector on the amplifier to CD.

2 Do Steps 2 to 4 in "Recording on an MD" on page 8 to prepare the deck for recording.

3 Insert a CD into the CD player.

4 Select the playback mode (Shuffle Play, Program Play, etc.) on the CD player.

5 Press STANDBY.
The CD player pauses for playing and the deck pauses for recording.

6 Press START.
The deck starts recording and the CD player starts playback.
The track number and elapsed recording time of the track appear in the display.

If the CD player does not start playing
Some CD player models may not respond when you press START on the remote of the deck. Press ⏸ on the remote of the CD player instead.

7 Press STOP to stop synchro-recording.

To pause recording
Press STANDBY or CD PLAYER ⏸.
To restart recording, press START or CD PLAYER ⏸.
A new track number is marked each time you pause recording.

You can use the remote of the CD player during synchro-recording
When you press ■, the CD player stops and the deck pauses for recording.
When you press ⏸, the CD player pauses and the deck pauses for recording.
To restart synchro-recording, press ▷.

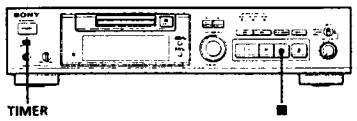
You can change CDs during synchro-recording
Do the following steps instead of Step 7 above.
1 Press ■ on the remote of the CD player.
The deck pauses for recording.
2 Change the CD.
3 Press ▷ on the remote of the CD player.
Synchro-recording restarts.

You can also do synchro-recording with a Sony video CD player
Using the procedure for synchro-recording with a Sony CD player, you can do synchro-recording with a Sony video CD player also.
To select the video CD player, press button number 2 while pressing down the POWER button before starting the procedure.
To select the CD player again, press button number 1 while pressing down the power button.
The deck is factory set to a CD player for synchro-recording.

You can check the remaining recordable time on the MD
Press DISPLAY (see page 11).

Recording on an MD Using a Timer

By connecting a timer (not supplied) to the deck, you can start and stop recording operations at specified times. For further information on connecting the timer and setting the starting and ending times, refer to the instructions that came with the timer.



1 Do Steps 1 to 6 in "Recording on an MD" on pages 8 and 9.

2
- If you want to specify the time for the start of recording, press ■.
- If you want to specify the time for the end of recording, do Steps 7 and 8 of "Recording on an MD" on page 9.
- If you want to specify the time for both start and end of recording, press ■.

3 Set TIMER on the deck to REC.

4 Set the timer as required.
- When you have set the time for the start of recording, the deck turns off. When the specified time arrives, the deck turns on and starts recording.
- When you have set the time for the end of recording, recording continues. When the specified time arrives, the deck stops recording and turns off.
- When you have set the time for both the start and end of recording, the deck turns off. When the starting time arrives, the deck turns on and starts recording. When the ending time arrives, the deck stops recording and turns off.

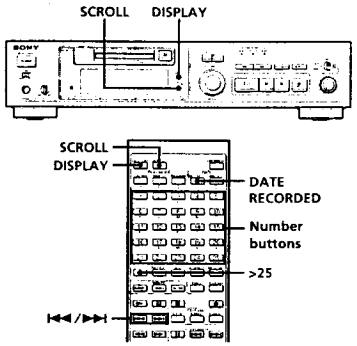
5 After you have finished using the timer, set TIMER on the deck to OFF. Then place the deck in standby status by plugging the AC power cord of the deck into a wall outlet or set the timer to continuous operation.
- If TIMER is left at REC, the deck will automatically start recording the next time you turn the deck on.
- If you do not change the deck to standby status for more than two or three days after timer recording has finished, the recorded contents may disappear.

Make sure to change the deck to standby status within two or three days after timer recording is completed
The TOC on the MD is updated and recorded contents are written to the MD when you turn the deck on. If the recorded contents have disappeared, "STANDBY" flashes when you turn the deck on.

Notes
- During timer recording, new material is recorded from the end of the recorded portion on the MD.
- Material recorded during timer recording will be saved to the disc the next time you turn the deck on. "TOC" will flash in the display at that time. Do not move the deck or pull out the AC power cord while "TOC" is flashing.
- Timer recording will stop if the disc becomes full.

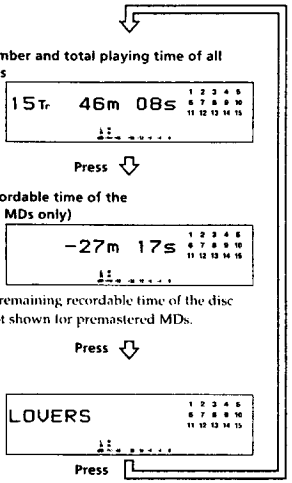
Using the Display

You can use the display to check disc and track information such as the total track number, total playing time of the tracks, remaining recordable time of the disc, disc name, and recording date and time of the current track.

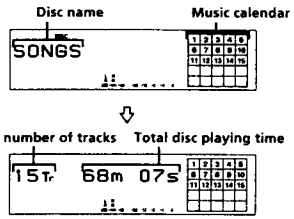


Checking the total track number, total disc playing time, remaining recordable time of the disc and the title of the disc

Each time you press DISPLAY while the deck is stopped, you can change the display as follows:



When you insert an MD, the disc name, total number of tracks, and total disc playing time appear in the display as follows:

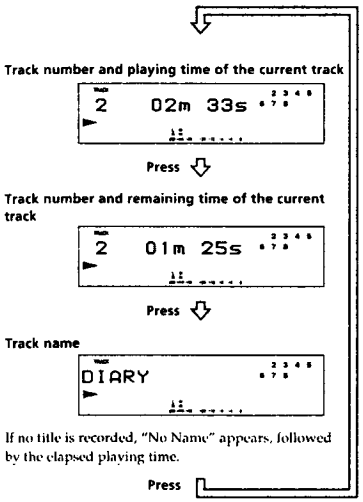


The disc name appears, followed by the total number of tracks (Tr) and total disc playing time.
A music calendar showing all the track numbers appears within a grid if the MD is a premastered disc, or without a grid if the MD is a recordable disc.
If the total track number exceeds 25, ▶ appears to the right of number 25 in the music calendar.
To label a recordable disc and its tracks, see "Labeling Recordings" on page 29.

Note
When you insert a new MD or turn off the deck and turn it on again, the last item displayed will reappear.
If, however, you disconnect the AC power cord, the display will show the total track number and total playing time of all recorded tracks the next time you turn on the deck, no matter what the last display was.

Checking remaining time and the title of a track

Each time you press DISPLAY while playing an MD, you can change the display as shown below. The track numbers in the music calendar disappear after they are played.



If no title is recorded, "No Name" appears, followed by the elapsed playing time.

You can check the track name at any time while playing an MD

Press SCROLL.

Since the display shows up to 12 characters at a time, press SCROLL again to see the rest of the track title if the title has 13 characters or more.

Press SCROLL again to pause scrolling, and again to continue scrolling.

Note

When you insert a new MD or turn off the deck and turn it on again, the last item displayed will reappear.

If, however, you disconnect the AC power cord, the display will show the total track number and total playing time of all recorded tracks the next time you turn on the deck, no matter what the last display was.

Displaying the recording date

When the internal clock has been set, the deck automatically records the recording date and time of all recordings. You can then check the recording date and time of a track.

1 Locate the track for which you want to check the recording date and time.

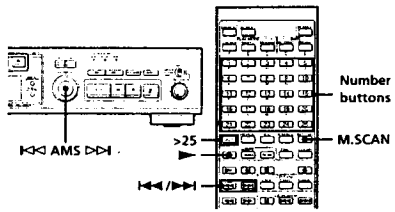
When the deck is	Press
stopped	⏮ or ⏭
playing or in play pause	⏮, ⏭ or number buttons

2 Press DATE RECORDED.

"No Date" appears if the internal clock has not been set or the track was recorded on another MD deck without a date and time stamp function.

Locating a Specific Track

You can quickly locate any track while playing a disc by using AMS (Automatic Music Sensor), ⏮ and ⏭, number buttons or M.SCAN on the remote.



To locate	Do the following:
The next or succeeding tracks	During playback, turn AMS clockwise or press ⏭ repeatedly until you find the track.
The current or preceding tracks	During playback, turn AMS counterclockwise or press ⏮ repeatedly until you find the track.
A specific track directly	Press number buttons to enter the track number.
By scanning each track for 6 seconds (music scan)	1 Press M.SCAN before you start playing. 2 When you find the track you want, press ▶ to start playing.

When you directly locate a track with a number over 25

You must press >25 first, before entering the corresponding digits.

Press >25 once if it is a 2-digit track number, and twice if it is a 3-digit track number.

To enter "0," press button 10.

Examples:
- To play track number 30
  Press >25 once, then 3 and 10.
- To play track number 100
  Press >25 twice, then 1, 10 and 10.

You can extend the playing time during music scan

While the deck is stopped, press M.SCAN repeatedly until the playing time you want (6, 10 or 20 seconds) appears in the display. Each press changes the time in order of 6 to 20, then from 6 again.

To pause playing at the beginning of a track

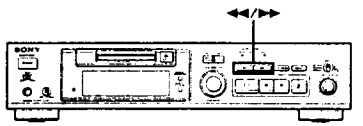
Turn AMS (or press ⏮ or ⏭) after pausing playback.

To go quickly to the beginning of the last track

Turn AMS counterclockwise (or press ⏮) while the display shows the total track number and total disc playing time, remaining recordable time of the disc, or disc name (see page 18).

Locating a Particular Point in a Track

You can also use ◀◀ and ▶▶ to locate a particular point in a track during playback or playback pause.



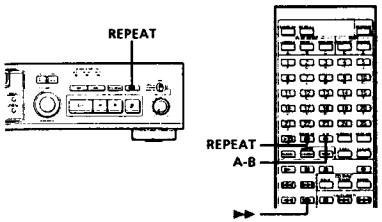
To locate a point	Press
While monitoring the sound	▶▶ (forward) or ◀◀ (backward) and keep pressing until you find the point
Quickly by observing the display during playback pause	▶▶ or ◀◀ and keep pressing until you find the point. There is no sound output during this operation.

Notes

- If the disc reaches the end while you are pressing ▶▶ during playback pause, "OVER" appears in the display. Press ◀◀ (or ⏮) or turn AMS counterclockwise to go back.
- If the disc reaches the end while you are pressing ▶▶ during sound monitoring, the deck stops.
- Tracks that are only a few seconds long may be too short to scan using the search function. For such tracks, it is better to play the MD at normal speed.

Playing Tracks Repeatedly

You can play tracks repeatedly in any play mode.



Press REPEAT.
"REPEAT" appears in the display. The deck repeats the tracks as follows:

When the MD is played in	The deck repeats
Normal play (page 10)	All the tracks
Shuffle Play (page 22)	All the tracks in random order
Program Play (page 22)	The same program

To cancel repeat play
Press REPEAT several times until "REPEAT" disappears.
The deck returns to the original playing mode.

Repeating the current track

While the track you want to repeat is playing in normal play, press REPEAT several times until "REPEAT 1" appears in the display.

Repeating a specific portion (A-B Repeat)

You can play a specific portion of a track repeatedly. This might be useful when you want to memorize lyrics.
Note that you can only repeat a portion within the boundaries of a single track.

1 While playing a disc, press A-B at the starting point (point A) of the portion to be played repeatedly.
"REPEAT A-" flashes in the display.

2 Continue playing the track or press ▶▶ until you reach the ending point (point B), then press A-B again.
"REPEAT A-B" lights continuously. The deck starts to play the specified portion repeatedly.

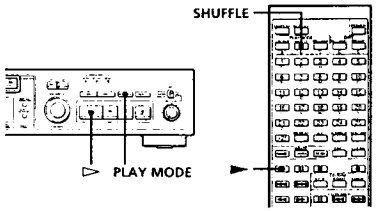
To cancel A-B Repeat
Press REPEAT.

Setting new starting and ending points
You can repeat the portion immediately after the currently specified portion by changing the starting and ending points.
1 Press A-B while "REPEAT A-B" appears.
The current ending point B becomes the new starting point A and "REPEAT A-" flashes in the display.
2 Continue playing the track or press ▶▶ until you reach the new ending point (point B), then press A-B again.
"REPEAT A-B" lights continuously and the deck starts playing repeatedly the newly specified portion.

Note
If you turn off the deck or disconnect the AC power cord, the deck will recall the last setting of the Repeat Function the next time you turn on the deck.
The A-B Repeat settings, however, are lost.

Playing in Random Order (Shuffle Play)

You can have the deck "shuffle" tracks and play them in random order.



1 Press PLAY MODE repeatedly (or SHUFFLE once) until "SHUFFLE" appears in the display when the deck is stopped.

2 Press ▷ to start Shuffle Play.
"🔀" appears in the display while the deck is "shuffling" the tracks.

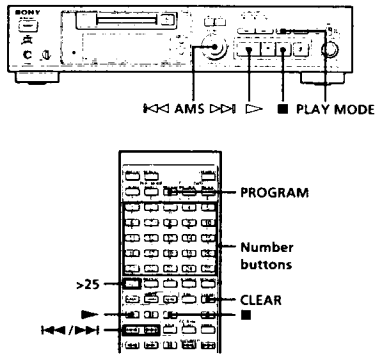
To cancel Shuffle Play
Press PLAY MODE repeatedly (or CONTINUE once) until "SHUFFLE" disappears.

You can specify tracks during Shuffle Play
- To play the next track, turn AMS clockwise (or press ▶▶I).
- To play from the beginning of the current track again, turn AMS counterclockwise (or press I◀◀). You cannot use AMS (or I◀◀) to go to tracks that have already been played.

Note
If you turn off the deck or disconnect the AC power cord while the Shuffle Play Function is selected, the Shuffle Play Function will be still selected the next time you turn on the deck.

Creating Your Own Program (Program Play)

You can specify the playback order of the tracks on an MD and create your own programs containing up to 25 tracks.



1 Press PLAY MODE repeatedly (or PROGRAM once) until "PROGRAM" appears in the display when the deck is stopped.

2 Do either a) or b):
a) When using the remote
Press the number buttons to enter the tracks you want to program in the order you want.
To program a track with a number over 25, use the >25 button (see page 20).

If you've made a mistake
Press CLEAR, then press the right number button.

b) When using the controls on the deck
1 Turn AMS until the track number you want appears in the display.
2 Press AMS or PLAY MODE.

3 Repeat Step 2 to enter other tracks. Each time you enter a track, the total program time is added up and appears in the display.

4 Press ▷ to start Program Play.

To cancel Program Play
Press PLAY MODE repeatedly (or CONTINUE once) when the deck is stopped until "PROGRAM" disappears.

Note
The program created by the Program Play Function is lost when you turn off the deck or disconnect the AC power cord. The program is, however, recalled during timer playback.

You can program the same track repeatedly
While the track number appears in the display, press AMS as many times as you want.

The program remains even after Program Play ends
When you press ▷, you can play the same program again.

Note
The display shows "- -m - -s" instead of the total playing time when the total playing time of the program exceeds 100 minutes.

Checking the track order

You can check the order of tracks in your program during playback or playback pause.

Turn AMS (or press ⏮ or ⏭) during playback or playback pause. The track numbers appear in the order they were programmed.

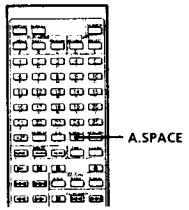
Changing the track order

You can change the order of the tracks in your program before you start playing.

To	Do the following:
Erase the last track in the program	Press CLEAR. Each time you press the button, the last track will be cleared.
Add tracks to the end of the program	Do Steps 2 and 3 in "Creating Your Own Program."
Change the whole program completely	1 Press ■ while the deck is stopped. 2 Do Steps 2 and 3 in "Creating Your Own Program."

Useful Tips When Recording From MDs to Tape

The Auto Space and Auto Pause Functions described in this section make recording from MDs to tape more easy.



Inserting blank spaces while recording to tape (Auto Space)

The Auto Space Function inserts a 3-second blank space between each track while recording from MDs to tapes, allowing you to use the AMS function during later playback.

Press A.SPACE repeatedly until "A.SPACE" appears in the display.

To cancel Auto Space
Press A.SPACE repeatedly until "A.SPACE" disappears.

Note
If the Auto Space Function is on while recording a selection containing multiple track numbers, (for example, a medley or symphony), blank spaces will be inserted within the selection whenever the track number changes.

Pausing after each track (Auto Pause)

When the Auto Pause Function is on, the deck pauses after playing each track. Auto Pause is convenient when recording single tracks or multiple, non-consecutive tracks.

Press A.SPACE repeatedly until "A.PAUSE" appears in the display.

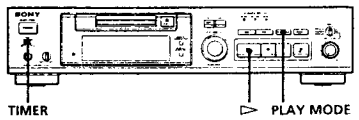
To restart playback
Press ▷ or ⏸.

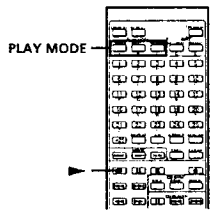
To cancel Auto Pause
Press A.SPACE repeatedly until "A.PAUSE" disappears.

Note
If you turn off the deck or disconnect the AC power cord, the deck will recall the last setting of the Auto Space and Auto Pause Functions the next time you turn on the deck.

Playing an MD Using a Timer

By connecting a timer (not supplied) to the deck, you can start and stop playback operations at specified times. For further information on connecting the timer or setting the starting and ending times, refer to the instructions that came with the timer.





1 Do Steps 1 to 3 in "Playing an MD" on page 10.

2 Press PLAY MODE repeatedly (or one of the PLAY MODE buttons once) to select the play mode you want.
To play only specific tracks, create a program (see page 22).

3
- If you want to specify the time for the start of playback, go to Step 4.
- If you want to specify the time for the end of playback, press ▷ to start playback, then go to Step 4.
- If you want to specify the time for both start and end of playback, go to Step 4.

4 Set TIMER on the deck to PLAY.

5 Set the timer as required.
- When you have set the time for the start of playback, the deck turns off. When the specified time arrives, the deck turns on and starts playing.
- When you have set the time for the end of playback, playback continues. When the specified time arrives, the deck stops playing and turns off.
- When you have set the time for both the start and end of playback, the deck turns off. When the starting time arrives, the deck turns on and starts playing. When the ending time arrives, the deck stops playing and turns off.

6 After you have finished using the timer, set TIMER on the deck to OFF.

Note
You can select Program Play in Step 2. Note, however, that programs eventually fade away when the standby status is off, and therefore if you set the time too far in the future, the program may be gone when the specified time arrives. If this has occurred, the deck enters normal play mode at the specified time and the tracks play in consecutive order.

Notes on Editing

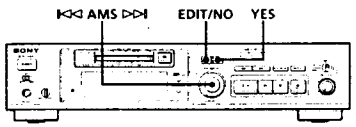
If "Protected" appears in the display
The deck could not erase the specified track because the record-protect slot on the MD is open. Erase the track after closing the slot.

When "TOC" flashes in the display
Do not move the deck or pull out the AC power cord. After editing, "TOC" lights continuously until you eject the MD or turn off the power. "TOC" flashes while the deck is updating the TOC. When the deck finishes updating the TOC, "TOC" goes off.

Erasing Recordings (Erase Function)

Do the procedures below to erase following:
- A single track
- All tracks
- Parts of a track

Note, however, that once erased, MD data cannot be recovered.

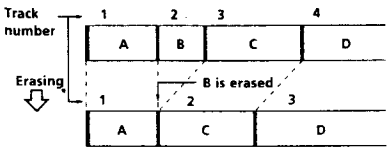


Erasing a single track

You can erase a track simply by specifying the respective track number. When you erase a track, the total number of tracks on the MD decreases by one and all tracks following the erased one are renumbered. Since erasing merely updates the TOC, there is no need to record over material.

To avoid confusion when erasing multiple tracks, you should proceed in order of high to low track number to prevent the renumbering of tracks that have not been erased yet.

Example: Erasing B



1 Turn AMS until the track number you want to erase appears in the display.

2 Press EDIT/NO repeatedly until "Erase ?" appears in the display.
The track number you selected starts flashing in the music calendar.

3 Press YES.
When the track selected in Step 1 has been erased, "Complete" appears for a few seconds and the total number of tracks in the music calendar decreases by one.
If you erase a track during playback, the track following the deleted track begins playing afterwards.

4 Repeat Steps 1 to 3 to erase more tracks.

To cancel the Erase Function
Press EDIT/NO, ■, or turn AMS to change the track number.

Note
If "Erase!! ?" appears in the display, the track was recorded or edited on another MD deck and is record-protected. If this indication appears, press YES to erase the track.

Erasing all tracks on an MD

Erasing a recordable MD deletes the disc name, all recorded tracks, and titles (see page 30).

1 While the deck is stopped, press EDIT/NO repeatedly until "All Erase ?" appears in the display.

2 Press YES.
All tracks in the music calendar start flashing.

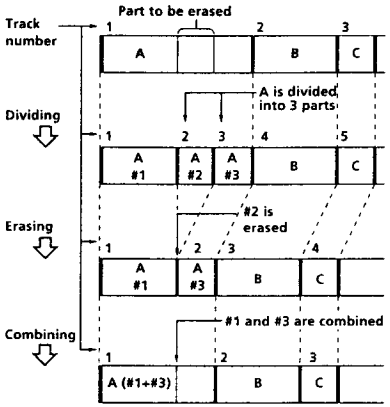
3 Press YES again.
When the disc name, all recorded tracks, and titles on the MD have been erased, "Complete" appears for a few seconds and the music calendar disappears.

To cancel the Erase Function
Press EDIT/NO or ■.

Erasing a part of a track

By using the Divide (see this page), Erase (see page 25) and Combine (see page 27) Functions, you can erase specific portions of a track.

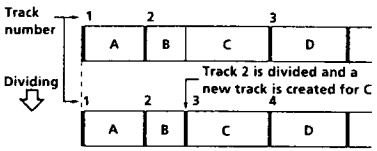
Example: Erasing a part of track A

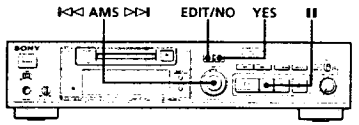


Dividing Recorded Tracks (Divide Function)

With the Divide Function you can assign a track number at places that you want to randomly access afterwards. Use this function to add tracks to MDs recorded from an analog source (and therefore contain no track numbers), or to divide an existing track into multiple portions. When you divide a track, the total number of tracks on the MD increases by one and all tracks following the divided track are renumbered.

Example: Dividing track 2 to create a new track for C



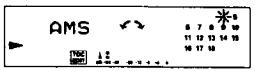


1 While playing the MD, press ❚❚ at the point where you want to create a new track.
The deck pauses playing.

2 Press EDIT/NO repeatedly until "Divide ?" appears in the display.

3 Press YES to divide the track.
"Rehearsal" alternates with "Position ok?" in the display, the track to be divided starts flashing in the music calendar, and the starting portion of the new track begins playing repeatedly.

4 If the starting position is incorrect, press EDIT/NO. (If it is correct, go to Step 7.)



5 While monitoring the sound, turn AMS to find the starting position of the new track.
The starting portion of the new track is played back repeatedly.
"Rehearsal" alternates with "Position ok?" in the display.
The starting position can be moved within a maximum range of –128 to +127 steps of about 0.06 second each within a track.

6 If the starting position is still incorrect, repeat Step 5 until it is correct.

7 Press YES or AMS when the position is correct.
When the track has been divided, "Complete" appears for a few seconds and the newly created track begins playing. The new track will have no track title even if the original track was labeled.

To cancel the Divide Function
Press ■.

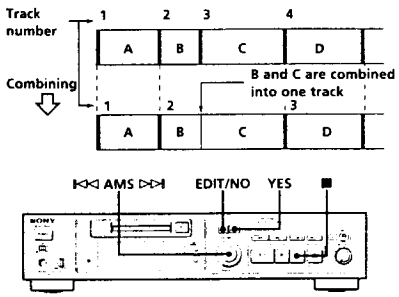
You can undo a track division
Combine the tracks again (see "Combining Recorded Tracks" on this page) then redivide the tracks if necessary.

You can divide a track while recording
Use the Track Marking Function (see page 14).

Combining Recorded Tracks (Combine Function)

Use the Combine Function while the deck is stopped, playing or in pause to combine consecutive tracks on a recorded MD. This function is useful for combining several songs into a single medley, or several independently recorded portions into a single track. When you combine two tracks, the total number of tracks decreases by one and all tracks following the combined tracks are renumbered.

Example: Combining B and C



1 Turn AMS until the second track of the two to be combined appears.
For example, when combining tracks 3 and 4, turn AMS until 4 appears.

2 Press EDIT/NO repeatedly until "Combine ?" appears in the display.

3 Press YES.
"Rehearsal" alternates with "Track ok?" in the display. The place where the two tracks will join (i.e., the end of the first track and the beginning of the second track) repeatedly plays back and the respective track number flashes in the music calendar.

4 If the track is the wrong one, press EDIT/NO or ■, then start from Step 1 again.

5 If the place is correct, press YES.
When the tracks have been combined, "Complete" appears for a few seconds and the total number of tracks in the music calendar decreases by one.
If both of the combined tracks have track titles, the title of the second track is erased.

To cancel the Combine Function
Press EDIT/NO or ■.

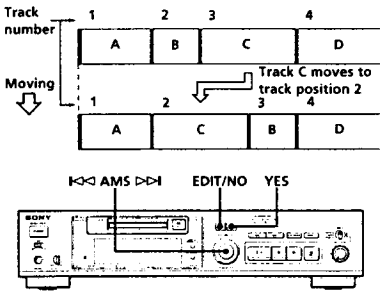
You can undo a track combination
Divide the tracks again (see "Dividing Recorded Tracks" on page 26), then repeat the combine function with the correct tracks if necessary.

Note
If "Sorry" appears in the display, the tracks cannot be combined. This sometimes happens when you've edited the same track many times, and is due to a technical limitation of the MD system, not a mechanical error.

Moving Recorded Tracks (Move Function)

Use the Move Function to change the order of any track. After you move a track, the track numbers between the new and old track positions are automatically renumbered.

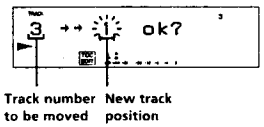
Example: Moving track C to track position 2



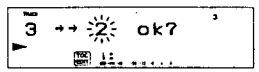
1 Turn AMS until the track number you want to move appears in the display.

2 Press EDIT/NO repeatedly until "Move ?" appears in the display.

3 Press YES.
The track number to be moved and the new track position appears.



4 Turn AMS until the new track position appears.

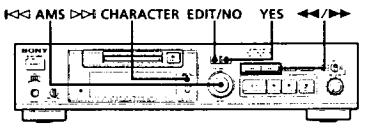


5 Press YES or AMS.
After you have moved the track, "Complete" appears for a few seconds and the moved track begins playing back if the deck is in playback mode.

To cancel the Move Function
Press EDIT/NO or ■

Labeling Recordings (Title Function)

You can create titles for your recorded MDs and tracks. Titles — which may consist of uppercase and lowercase letters, numbers and symbols for a maximum of about 1,700 characters per disc — appear in the display during MD operation.



Use the following procedure to label a track or an MD. **You can label a track while it is playing, pausing or recording. If the track is playing, be sure to finish labeling before the track ends. If the track ends before you've completed the labeling procedure, the characters already entered are not recorded and the track will remain unlabeled.**

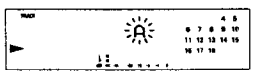
1 Press EDIT/NO repeatedly until "Name in ?" appears in the display, then do the following:

To label	Make sure that the deck is
A track	Playing, pausing, recording the track to be labeled, or stopped after locating the track to be labeled
An MD	Stopped with no track number appearing in the display

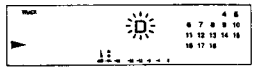
2 Press YES.
A flashing cursor appears in the display.

3 Press CHARACTER to select the character type as follows :

To select	Press CHARACTER repeatedly until
Uppercase letters	"A" appears in the display
Lowercase letters	"a" appears in the display
Numbers	"0" appears in the display



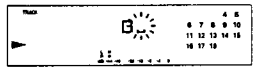
4 Turn AMS to select the character.



The selected character flashes.
Letters, numbers, and symbols appear in sequential order as you turn AMS.
You can use the following symbols in titles:
! " # $ % & ' ( ) * + , - . / : ; < = > ? @ _ `

You can press CHARACTER to change the character type at any time during Step 4 (see Step 3).

5 Press AMS to enter the selected character.
The cursor shifts rightward and waits for the input of the next character.



6 Repeat Steps 3 to 5 until you have entered the entire title.

If you entered the wrong character
Press ◀◀ or ▶▶ until the character to be corrected starts flashing, and repeat Steps 3 to 5 to enter the correct character.

To erase a character
Press ◀◀ or ▶▶ until the character to be erased starts flashing, then press EDIT/NO.

To enter a space
Press AMS or ▶▶ while the cursor is flashing.

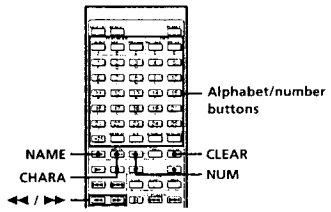
7 Press YES.
This completes the labeling procedure and the title appears on the left side of the display.

To cancel labeling
Press ■.

Note
You cannot label a track or an MD while you are recording over an existing track.

Labeling tracks and MDs with the remote

RM-D5M



1 Press NAME repeatedly until a flashing cursor appears in the display, then do the following:

To label	Make sure that the deck is
A track	Playing, pausing, recording the track to be labeled, or stopped after locating the track to be labeled
An MD	Stopped with no track number appearing in the display

2 Select the character type as follows:

To select	Press
Uppercase letters	CHARA repeatedly until "Selected ABC" appears in the display
Lowercase letters	CHARA repeatedly until "Selected abc" appears in the display
Numbers	NUM repeatedly until "Selected 123" appears in the display

3 Enter one character at a time.
After you enter a character, the cursor shifts rightward and waits for the input of the next character.

4 Repeat Steps 2 and 3 until you have entered the entire title.

If you entered the wrong character
Press ◀◀ or ▶▶ until the character to be corrected starts flashing.
Press CLEAR to erase the incorrect character, then enter the correct one.

5 Press NAME again.
The entered title appears on the left side of the display window after the label has been recorded.

To cancel labeling
Press ■.

Changing an existing title

1 Press NAME, then do the following:

To change	Make sure that the deck is
A track title	Playing, pausing the track whose title is to be changed, or stopped after locating the track whose title is to be changed
A disc name	Stopped with no track number appearing in the display

2 Keep pressing CLEAR (or EDIT/NO on the deck) until the current title is erased.

3 Enter the new title.
Do Steps 3 to 5 of "Labeling Recordings" on page 29, or Steps 2 to 4 of "Labeling tracks and MDs with the remote" on this page.

4 Press NAME.

Erasing all titles on a disc (Name Erase Function)

Use this function to erase all titles on an MD simultaneously.
Note that once erased, titles cannot be recovered.

1 Keep pressing EDIT/NO while the deck is stopped until "All Erase ?" appears in the display.

2 Press EDIT/NO again.
"Name Erase ?" appears in the display.

3 Press YES.
All titles are erased.

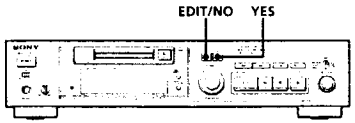
To cancel the Name Erase Function
Press ■.

You can erase all recorded tracks and titles
See "Erasing all tracks on an MD" on page 25.

Undoing the Last Edit (Undo Function)

You can use the Undo Function to cancel the last edit and restore the contents of the MD to the condition that existed before editing was done. Note, however, that you cannot undo an edit if you do any of the following after the edit:

- Press the ● REC button on the front panel or the CD-SYNC STANDBY button on the remote
- Update the TOC by turning off the power or ejecting the MD
- Disconnect the AC power cord



1 With the deck stopped and no track number appearing in the display, press EDIT/NO repeatedly until "Undo ?" appears in the display. "Undo ?" does not appear if no editing has been done.

2 Press YES.
One of the following messages appears in the display, depending on the type of editing to be undone:

Editing done:	Message:
Erasing a single track	"Erase Undo ?"
Erasing all tracks on an MD	
Dividing a track	"Divide Undo ?"
Combining tracks	"Combine Undo ?"
Moving a track	"Move Undo ?"
Labeling a track or an MD	"Name Undo ?"
Changing an existing title	
Erasing all titles on an MD	

3 Press YES again.
"Complete" appears for a few seconds and the contents of the MD are restored to the condition that existed before the edit.

To cancel the Undo Function
Press EDIT/NO or ■.

Display Messages

The following table explains the various messages that appear in the display.

Message	Meaning
Blank Disc	A new (blank) or erased MD has been inserted.
Cannot Copy	An attempt was made to make a second copy from a digitally dubbed MD (see page 34).
Cannot EDIT	An attempt was made to edit the MD during Program or Shuffle Play.
Disc Error	The MD is scratched or missing a TOC.
Disc Full	The MD is full (see "System Limitations" on page 32).
Impossible	An attempt was made to combine tracks while playing back the first track.
Name Full	The titling capacity of the MD has reached its limit (about 1,792 characters).
NO DISC	There is no MD in the deck.
No Track	The inserted MD has a disc title but no tracks.
Protected	The inserted MD is record-protected.
Retry	The first recording attempt failed due to a disturbance or scratch on the MD, and a second attempt is being made.
Retry Error	Due to vibrations to the deck or scratches on the MD, several recording attempts were made but with no success.
Sorry	An attempt was made to combine tracks that cannot be combined.
STANDBY (flashing)	The contents recorded by timer have disappeared over time and are not be available for saving to disc, or Program Play could not be activated since the program has disappeared over time.

System Limitations

The recording system in your MiniDisc deck is radically different from those used in cassette and DAT decks and is characterized by the limitations described below. Note, however, that these limitations are due to the inherent nature of the MD recording system itself and not to mechanical causes.

"Disc Full" lights up even before the MD has reached the maximum recording time (60 or 74 minutes)
When 255 tracks have been recorded on the MD, "Disc Full" lights up regardless of the total recorded time. More than 255 tracks cannot be recorded on the MD. To continue recording, erase unnecessary tracks or use another recordable MD.

"Disc Full" lights up before the maximum number of tracks is reached
Fluctuations in emphasis within tracks are sometimes interpreted as track intervals, incrementing the track count and causing "Disc Full" to light up.

The remaining recording time does not increase even after erasing numerous short tracks
Tracks under 12 seconds in length are not counted and so erasing them may not lead to an increase in the recording time.

Some tracks cannot be combined with others
Track combination may become impossible when tracks are edited.

The total recorded time and the remaining time on the MD may not total the maximum recording time (60 or 74 minutes)
Recording is done in minimum units of 2 seconds each, no matter how short the material. The contents recorded may thus be shorter than the maximum recording capacity. Disc space may also be further reduced by scratches.

Tracks created through editing may exhibit sound dropout during search operations.

Track numbers are not recorded correctly
Incorrect assignment or recording of track numbers may result (1) when CD tracks are divided into several smaller tracks during digital recording, or (2) while recording certain CDs with the "LEVEL SYNC" indication on (i.e., the automatic track marking function on).

"TOC Reading" appears for a long time
If the inserted recordable MD is brand new, "TOC Reading" appears in the display longer than for MDs that have been used.

Limitations when recording over an existing track

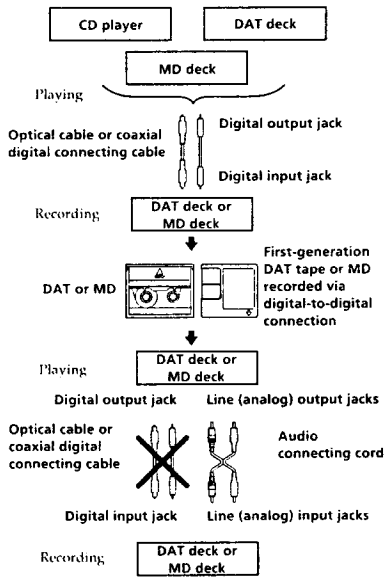
- The correct remaining recording time may not be displayed.
- You may find it impossible to record over a track if that track has been recorded over several times already. If this happens, erase the track using the Erase Function (see page 25).
- The remaining recording time may be shortened out of proportion to the total recorded time.
- Recording over a track to eliminate noise is not recommended since this may shorten the duration of the track.
- You may find it impossible to label a track while recording over it.

The correct recorded/playing time may not be displayed during playback of monaural-format MDs.

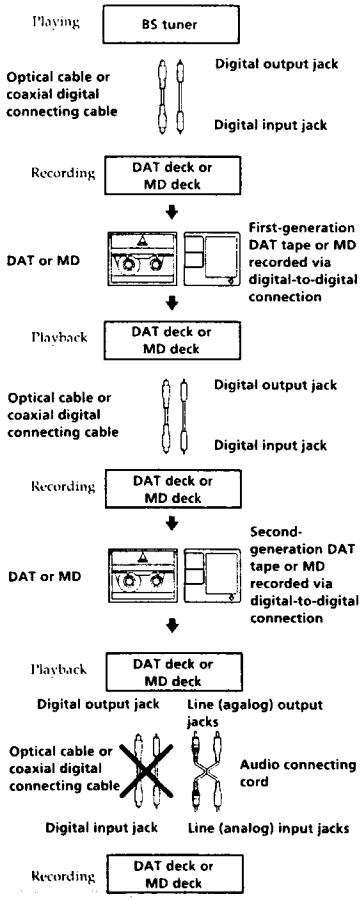
Guide to the Serial Copy Management System

This MD deck uses the Serial Copy Management System, which allows only first-generation digital copies to be made of premastered software via the deck's digital input jack. An outline of this system appears below:

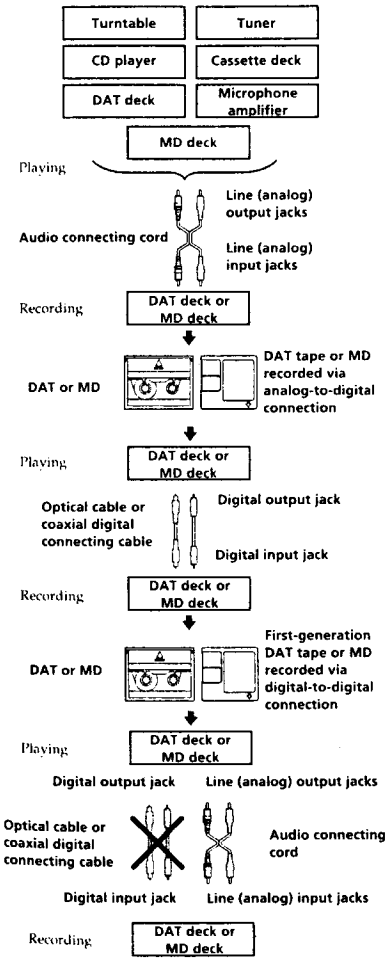
1 You can record from digital program sources (CDs, DATs or premastered MDs) onto a DAT tape or recordable MD via digital input jack on the DAT or MD deck. You cannot, however, record from this recorded DAT tape or MD onto another DAT tape or recordable MD via the digital input jack on the DAT or MD deck.



2 You can record the digital input signal of a digital satellite broadcast onto a DAT tape or recordable MD via the digital input jack on the DAT or MD deck which is capable of handling a sampling frequeny of 32 kHz or 48 kHz. You can then record the contents of this recorded DAT tape or MD (first-generation) onto another DAT tape or recordable MD via digital input jack on the DAT or MD deck to create a second-generation digital copy. Subsequent recording from the second-generation copy onto another recordable DAT tape or MD is possible only through the analog input jack on the DAT or MD deck. Note, however, that on some BS tuners, second-generation digital copying may not be possible.



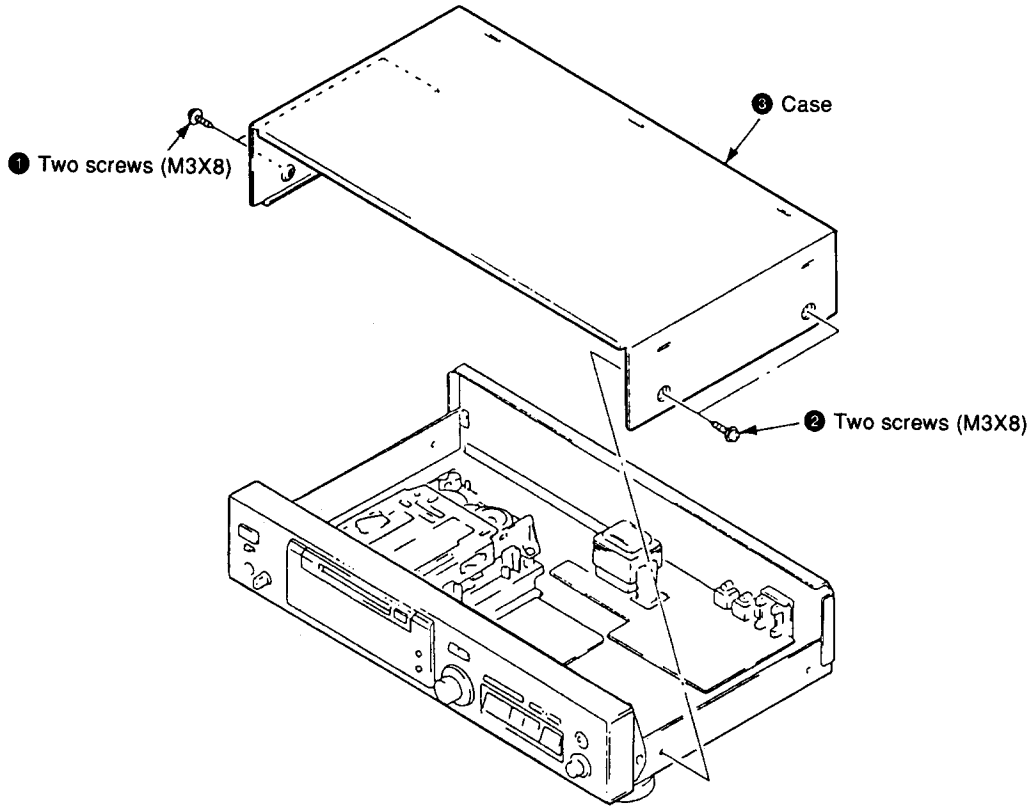
3 You can record a DAT tape or MD recorded via the DAT or MD deck's analog input jack onto another DAT tape or MD via the DAT or MD deck's digital output jack. You cannot, however, make a second-generation DAT tape or MD copy via the DAT or MD deck's digital output jack.



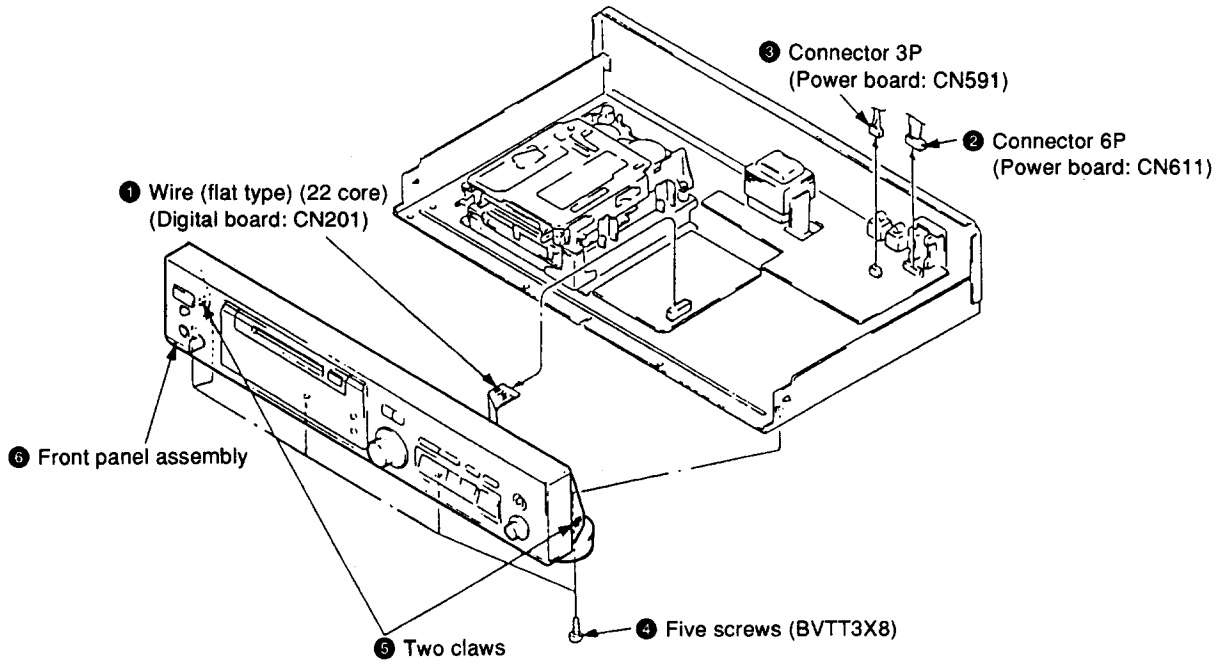
SECTION 3
DISASSEMBLY

Note : Follow the disassembly procedure in the numerical order given.

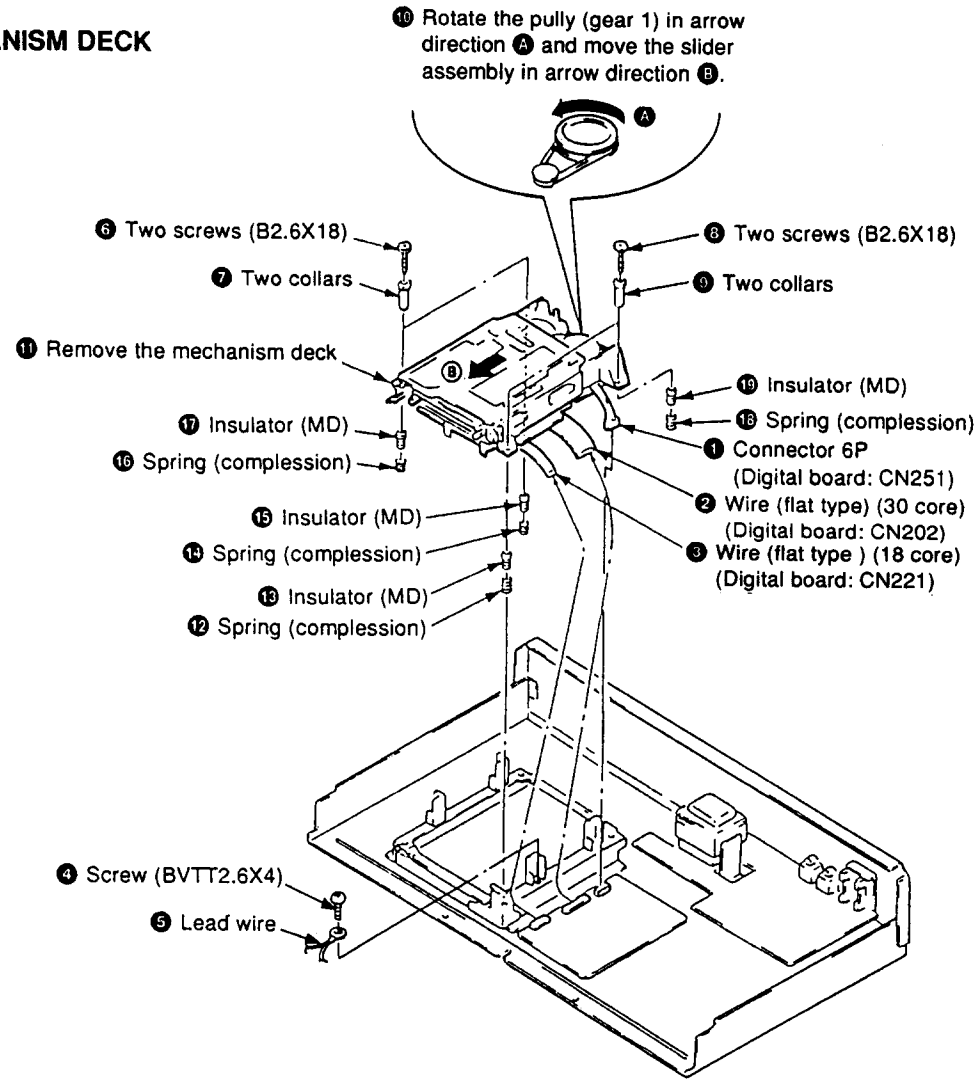
3-1. CASE



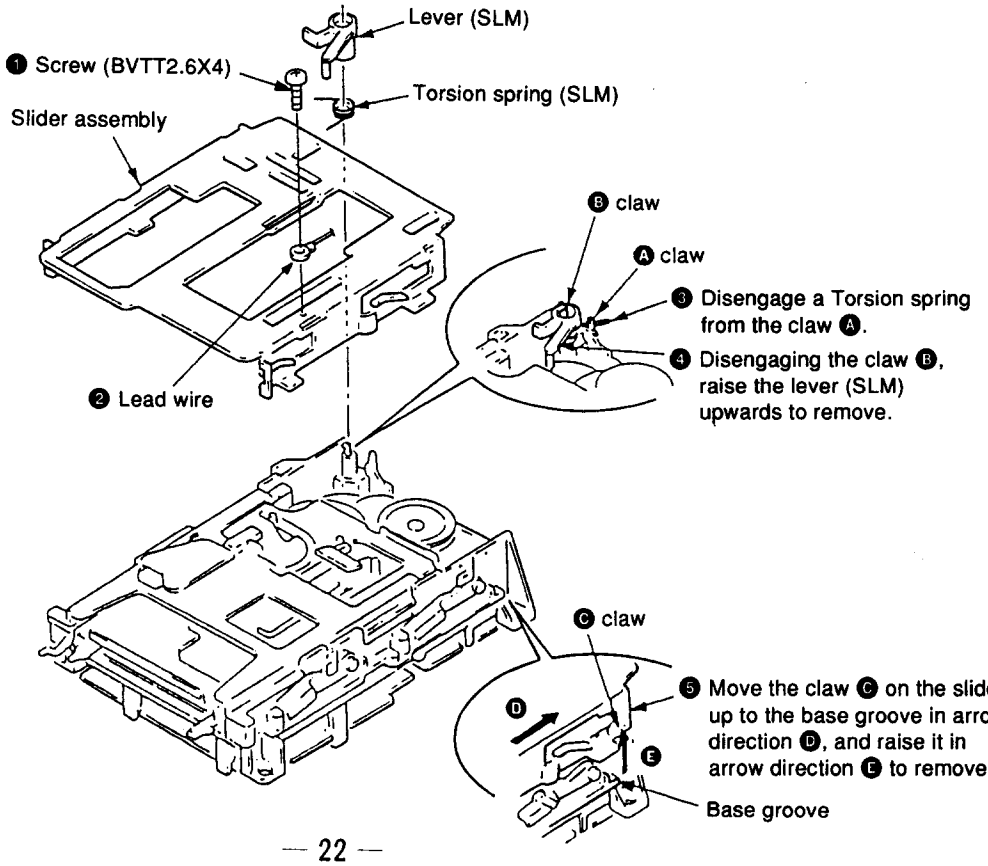
3-2. FRONT PANEL ASSEMBLY



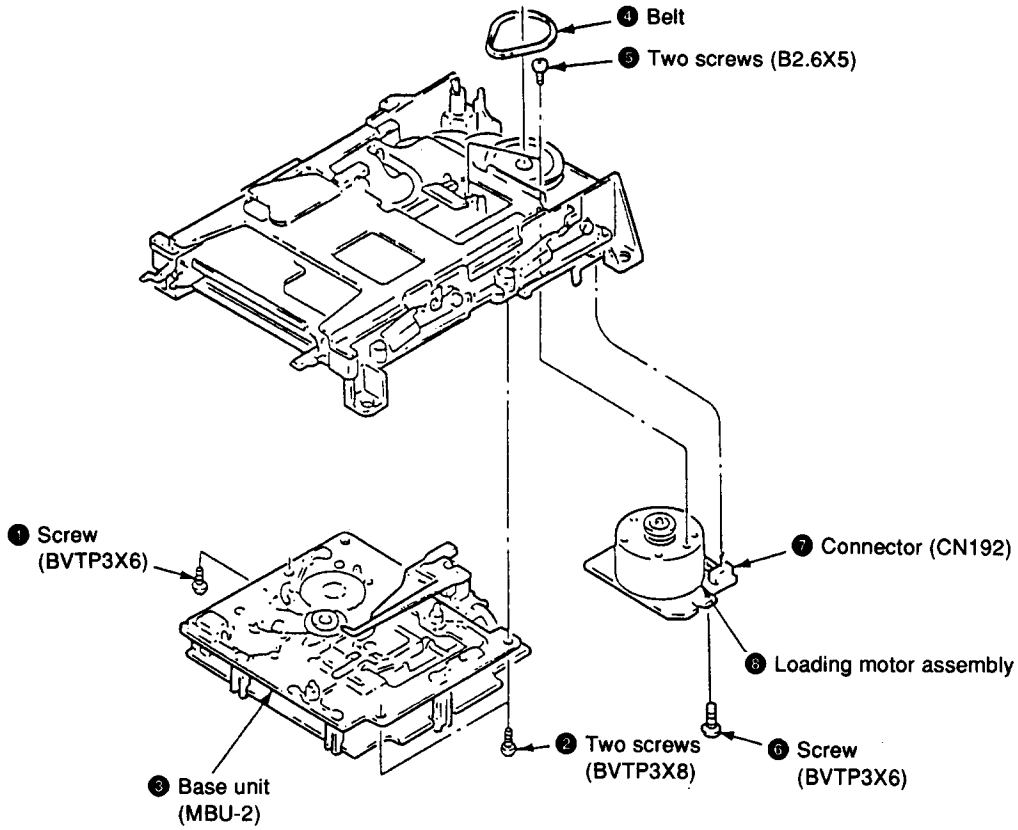
3-3. MECHANISM DECK



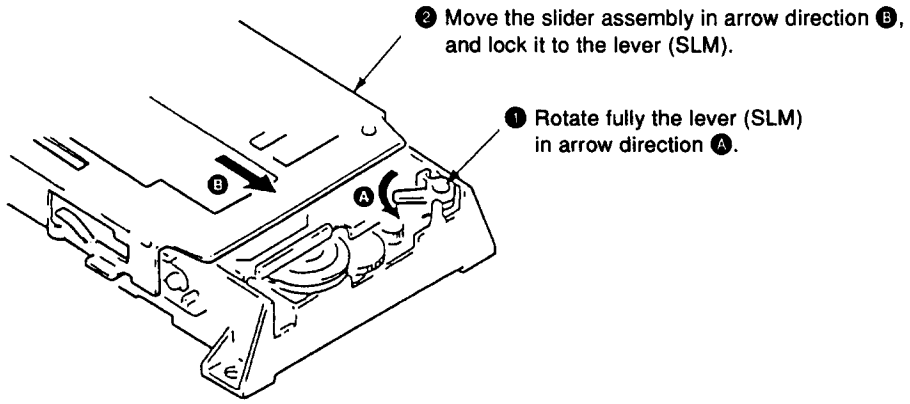
3-4. SLIDER ASSEMBLY



3-5. BASE UNIT AND LOADING MOTOR ASSEMBLY



3-6. SLIDER ASSEMBLY MOUNTING



SECTION 4
TEST MODE

4-1. Setting the Test Mode

While pressing the AMS knob, insert the power plug into the power supply inlet, and release the AMS knob.

4-2. Exiting the Test Mode

1. Press the REPEAT button.
2. In case a disc is unloaded, the display "STANDBY" will go on and off.
   In case a disc is loaded, the "STANDBY" is displayed once and the disc is ejected.
3. Unplug the power plug from an outlet.

4-3. Basic Operations of the Test Mode

All operations are performed using the AMS knob, YES button, and NO button.
The functions of these buttons are as follows.

Function	Contents
AMS knob	Changes parameters and modes
YES button	Proceeds onto the next step. Finalizes input.
NO button	Returns to previous step. Stops operations.

4-4. Selecting the Test Mode

Eight test modes are selected by turning the AMS knob.

Display	Contents
TEMP ADJUST	Temperature compensation offset adjustment
LDPWR ADJUST	Laser power adjustment
EFBAL ADJUST	Traverse adjustment
FBIAS ADJUST	Focus bias adjustment
FBIAS CHECK	Focus bias check
CPLAY MODE	Continuous playback mode
CREC MODE	Continuous recording mode
EEP MODE	Non-volatile memory mode *

For detailed description of each adjustment mode, refer to 5. Electrical Adjustments.
If a different adjustment mode has been selected by mistake, press the NO button to exit from it.
* The EEP MODE is not used in servicing. If set accidentally, press the NO button immediately to exit it.

4-4-1. Operating the Continuous Playback Mode

1. Entering the continuous playback mode
   ① Set the disc in the unit (either MO or CD).
   ② Rotate the AMS knob and display "CPLAY MODE".
   ③ Press the YES button to change the display to "CPLAYIN".
   ④ When access completes, the display changes to "C1 = [illegible] AD = [illegible]".
   Note : The "[illegible]" displayed are arbitrary numbers.
2. Changing the parts to be played back
   ① Press the YES button during continuous playback to change the display to "CPLY MID", "CPLAY OUT". When pressed another time, the parts to be played back can be changed.
   ② When access completes, the display changes to "C1 = [illegible] AD = [illegible]".
   Note : The "[illegible]" displayed are arbitrary numbers.
3. Ending the continuous playback mode
   ① Press the NO button. The display will change to "CPLY MODE".
   ② Press the EJECT button and remove the disc.
   Note 1 : The playback start addresses for IN, MID, and OUT are as follows.
   IN 40h cluster
   MID 300h cluster
   OUT 700h cluster

4-4-2. Operating the Continuous Recording Mode

1. Entering the continuous recording mode
   ① Set the MO disc in the unit.
   ② Rotate the AMS knob and display "CREC MODE".
   ③ Press the YES button to change the display to "CREC IN".
   ④ When access completes, the display changes to "CREC (▯▯▯)" and REC lights up.
   Note : The "▯" displayed are arbitrary numbers.
2. Changing the parts to be recorded
   ① When the YES button is pressed during continuous recording, the display changes to "CREC MID", "CREC OUT" and REC goes off.
   When pressed another time, the parts to be recorded can be changed.
   ② When access completes, the display changes to "CREC (▯▯▯)" and REC lights up.
   Note : The "▯" displayed are arbitrary numbers.
3. Ending the continuous recording mode
   ① Press the NO button. The display changes to "CREC MODE" and REC goes off.
   ② Press the EJECT button and remove the disc.
   Note 1 : The recording start addresses for IN, MID, and OUT are as follows.
   IN 40h cluster
   MID 300h cluster
   OUT 700h cluster
   Note 2 : The NO button can be used to stop recording anytime.
   Note 3 : During the test mode, the erasing-protection tab will not be detected. Therefore be careful not to set the continuous recording mode when a disc not to be erased is set in the unit.
   Note 4 : Do not perform continuous recording for long periods of time above 5 minutes.
   Note 5 : During continuous recording, be careful not to apply vibration.

4-4-3. Non-Volatile Memory Mode

This mode reads and writes the contents of the non-volatile memory.
It is not used in servicing. If set accidentally, press the NO button immediately to exit it.

4-5. Functions of Other buttons

Function	Contents
▷	Sets continuous playback when pressed in the STOP state. When pressed during continuous playback, the tracking servo turns ON/OFF.
■	Stops continuous playback and continuous recording.
▶▶	The sled moves to the outer circumference only when this is pressed.
◀◀	The sled moves to the inner circumference only when this is pressed.
●	Turns recording ON/OFF when pressed during continuous playback.
SCROLL	Switches between the pit and groove modes when pressed.
PLAY MODE	Switches the spindle servo mode (CLVS and A).
DISPLAY	Switches the display when pressed.Returns to previous step. Stops operations.

Note : The erasing-protection tab is not detected during the test mode. Recording will start regardless of the position of the erasing-protection tab when the ● (REC) button is pressed.

4-6. Test Mode Displays

Each time the DISPLAY button is pressed, the display changes in the following order.

MODE display→Error rate display→Address display

1. MODE display
   Displays "TEMP ADJUST", "CPLAY MODE", etc.
2. Error rate display
   Error rates are displayed as follows.
   C1 = [illegible] AD = [illegible]
   C1 = : Indicates C1 error
   AD= : Indicates ADER
3. Address display
   Addresses are displayed as follows.
   h = [illegible] s = [illegible] (MO pit and CD)
   h = [illegible] a = [illegible] (MO groove)
   h = : Header address
   s = : SUBQ address
   a = : ADIP address
   * is displayed when the address cannot be read.

4-7. Meanings of Other Displays

Display	Contents		
	Light	Off	Blinking
▷	During continuous playback	STOP	
II	Tracking servo OFF	Tracking servo ON	
REC	Recording mode ON	Recording mode OFF	
CLOCK	CLV LOCK	CLV UNLOCK	
TRACK	Pit	Groove	
DISC	High reflection	Low reflection	
DATE	CLV-S	CLV-A	
A. SPACE	ABCD adjustment completed		
A - B	(Focus auto gain successful / Tracking auto gain successful)		(Focus auto gain successful / Tracking auto gain failed)

4-8. Precautions for Use of Test Mode

① As loading related operations will be performed regardless of the test mode operations being performed, be sure to check that the disc is stopped before setting and removing it.
Even if the EJECT button is pressed while the disc is rotating during continuous playback, continuous recording, etc., the disc will not stop rotating.
Therefore, it will be ejected while rotating.
Always press the NO button first before pressing the EJECT button.

② The erasing-protection tab is not detected in the test mode. Therefore, when modes which output the recording laser power such as continuous recording mode and traverse adjustment mode, etc. are set, the recorded contents will be erased regardless of the position of the tab. When using a disc that is not to be erased in the test mode, be careful not to enter the continuous recording mode and traverse adjustment mode.

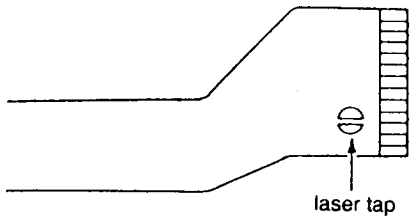
SECTION 5.
ELECTRICAL ADJUSTMENTS

5-1. Precautions for Checking Laser Diode Emission

To check the emission of the laser diode during adjustments, never view directly from the top as this may lose your eye-sight.

5-2. Precautions for Use of optical pickup (KMS-210A)

As the laser diode in the optical pickup is easily damaged by static electricity, solder the laser tap of the flexible board when using it. Before disconnecting the connector, desolder first. Before connecting the connector, be careful not to remove the solder. Also take adequate measures to prevent damage by static electricity. Handle the flexible board with care as it breaks easily.



Optical pickup flexible board

5-3. Precautions for Adjustments

1) When replacing the following parts, perform the adjustments and checks with O in the order shown in the following table.

	Optical Pickup	BD Board		
		IC171	D101	IC101, IC121, IC191
1. Temperature compensation offset adjustment	X	O	O	O
2. Laser power adjustment	O	X	X	O
3. Traverse adjustment	O	O	X	O
4. Focus bias adjustment	O	O	X	O
5. Error rate check	O	O	X	O

2) Set the test mode when performing adjustments.
   After completing the adjustments, exit the test mode.
3) Perform the adjustments in the order shown.
4) Use the following tools and measuring devices.
   - MD test disc (CD) TDYS-1 (Parts No. 4-963-646-01)
   - Laser power meter LPM-8001 (Parts No. J-2501-046-A)
   - Oscilloscope
   - Digital voltmeter
   - Thermometer
5) When observing several signals on the oscilloscope, etc., make sure that VC and GND do not connect inside the oscilloscope.
   (VC and GND will become short-circuited.)

5-4. Creating MO Continuously Recorded Disc

* This disc is used in focus bias adjustment and error rate check. The following describes how to create a MO continuous recording disc.

1. Insert a MO disc (blank disc) commercially available.
2. Rotate the AMS knob and display "CREC MODE".
3. Press the YES button and display "CREC IN".
4. Press the YES button again to display "CREC MID". "CREC (0300)" is displayed for a moment and recording starts.
5. Complete recording within 5 minutes.
6. Press the NO button and stop recording .
7. Press the EJECT button and remove the MO disc.

The above has been how to create a continuous recording data for the focus bias adjustment and error rate check.

Note :

- Be careful not to apply vibration during continuous recording.

5-5. Temperature Compensation Offset Adjustment

Save the temperature data at that time in the non-volatile memory as 25 °C reference data.

Note :

1. Usually, do not perform this adjustment.
2. Perform this adjustment in an ambient temperature of 22 °C to 28 °C. Perform it immediately after the power is turned on when the internal temperature of the unit is the same as the ambient temperature.
3. When D101 has been replaced, perform this adjustment after the temperature of this part has become the ambient temperature.

Adjusting Method :

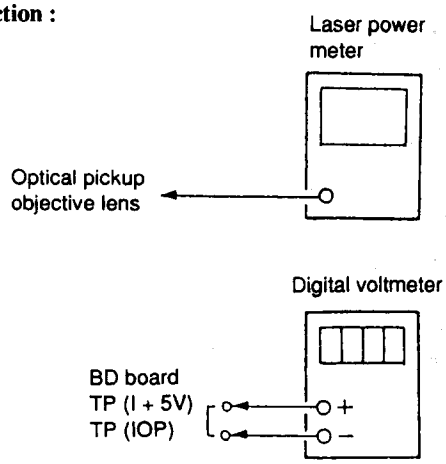
1. Rotate the AMS knob and display "TEMP ADJUST".
2. Press the YES button and select the "TEMP ADJUST" mode.
3. "TEMP = ▯▯" and the current temperature data will be displayed.
4. To save the data, press the YES button.
   When not saving the data, press the NO button.
5. When the YES button is pressed, "TEMP = ▯▯ SAVE" will be displayed for some time, followed by "TEMP ADJUST". When the NO button is pressed, "TEMP ADJUST" will be displayed.

Specifications :

The "TEMP = ▯▯" should be within "E0 - EF", "F0 - FF", "00 - 0F", "10 - 1F" and "20 - 2F".

5-6. Laser Power Adjustment

Connection :



Adjusting Method :

1. Set the laser power meter on the objective lens of the optical pickup. (When it cannot be set properly, press the ◄◄ button or ►► button and move the optical pickup.)
   Connect the digital volt meter to TP (IOP) and TP (I+5V).
2. Rotate the AMS knob and display "LDPWRADJUST".
   (Laser power : For adjustment)
3. Press the YES button twice and display "LD $ 4B = 3.5 mW".
4. Adjust RV102 of the BD board so that the reading of the laser power meter becomes $3.4^{+0.1}_{-0}$ mW.
5. Press the YES button and display "LD $ 96 = 7.0 mW".
   (Laser power:MO reading)
6. Check that the laser power meter and digital voltmeter readings satisfy the specified value.

   Specification :
   Laser power meter reading : 7.0 ± 0.3 mW
   Digital voltmeter reading : Optical pickup displayed value ± 10%

   (Optical pickup label)

   Iop = 82.5 mA in this case
   Iop (mA) = Digital voltmeter reading (mV)/ 1 (Ω)

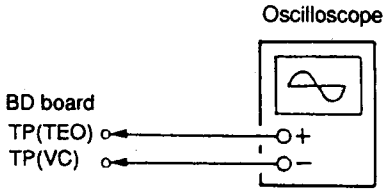
7. Press the YES button and display "LD $ 0F = 0.7 mW".
   (Laser power:MO reading)
8. Check that the laser power meter at this time satisfies the specified value.

   Specification :
   Laser power meter reading : 0.70 ± 0.1 mW

9. Press the NO button and display "LDPWR ADJUST', and stop laser emission.
   (The NO button is effective at all times to stop the laser emission.)

5-7. Traverse Adjustment

Connection :



Adjusting method :

1. Connect an oscilloscope to TP (TEO) and TP (VC) of the BD board.
2. Load a MO disc (any available on the market).
3. Press the ◄◄ button or ►► button and move the optical pickup outside the pit.
4. Rotate the AMS knob and display "EFBAL ADJUST".
5. Press the YES button and display "EFBAL MO-W". (Laser power WRITE power/Focus servo ON/tracking servo OFF/spindle (S) servo ON)
6. Adjust RV101 of the BD board so that the waveform of the oscilloscope becomes the specified value. (MO groove write power traverse adjustment)

(Traverse Waveform)

Specification A = B

7. Press the YES button and display "EFB = $ ▯ MO-R". (Laser power : MO reading)
8. Rotate the AMS knob so that the waveform of the oscilloscope becomes the specified value. (When the AMS knob is rotated, the ▯ of "EFB- ▯ " changes and the waveform changes.) In this adjustment, waveform varies at intervals of approx. 3%. Adjust the waveform so that the specified value is satisfied as much as possible. (MO groove read power traverse adjustment)

(Traverse Waveform)

Specification A=B

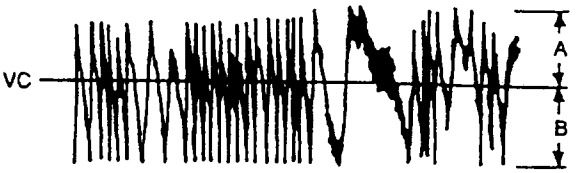
9. Press the YES button, display "EFB = $ ▯ SAVE" for a moment and save the adjustment results in the non-volatile memory.
   Next "EFBAL MO-P" is displayed.
10. Press the YES button and display "EFB = $ ▯ MO-P". The optical pickup moves to the pit area automatically and servo is imposed.
11. Rotate the AMS knob until the waveform of the oscilloscope moves closer to the specified value.
    In this adjustment, waveform varies at intervals of approx. 3%. Adjust the waveform so that the specified value is satisfied as much as possible.

(Traverse Waveform)

Specification A=B

12. Press the YES button, display "EFB = ▯ SAVE" for a moment and save the adjustment results in the non-volatile memory.
    Next "EFBAL CD" is displayed. The disc stops rotating automatically.
13. Press the EJECT button and remove the MO disc.
14. Load the test disc TDYS-1.
15. Press the YES button and display "EFB = ▯ CD". Servo is imposed automatically.
16. Rotate the AMS knob so that the waveform of the oscilloscope moves closer to the specified value.
    In this adjustment, waveform varies at intervals of approx. 3%. Adjust the waveform so that the specified value is satisfied as much as possible.

(Traverse Waveform)

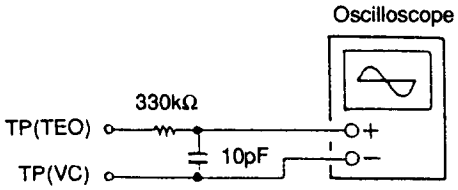


Specification A=B

17. Press the YES button, display "EFB = $ ▯ SAVE" for a moment and save the adjustment results in the non-volatile memory.
    Next "EFBAL ADJUST" is displayed.
18. Press the EJECT button and remove the test disc TDYS-1.

Note 1) Data will be erased during MO reading if a recorded disc is used in this adjustment.

Note 2) If the traverse waveform is not clear, connect the oscilloscope as shown in the following figure so that it can be seen more clearly.



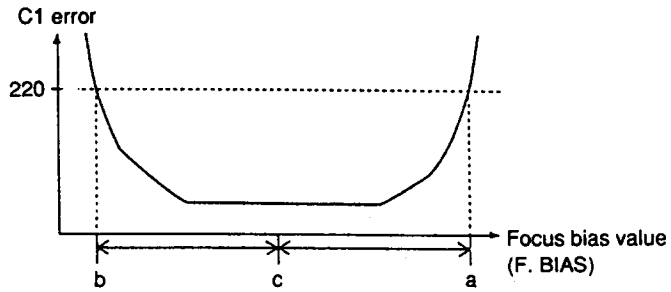
5-8. Focus Bias Adjustment

Adjusting Method :

1. Load a continuously recorded disc (Refer to "5-4. Creating MO Continuously Recorded Disc".).
2. Rotate the AMS knob and display "CPLAY MODE".
3. Press the YES button twice and display "CPLAY MID".
4. Press the NO button when "C1 = [illegible] AD = [illegible]" is displayed.
5. Rotate the AMS knob and display "FBIAS ADJUST".
6. Press the YES button and display " [illegible] a = [illegible]".
   The first four digits indicate the C1 error rate, the two digits after [/] indicate ADER, and the 2 digits after [a =] indicate the focus bias value.
7. Rotate the AMS knob in the clockwise direction and find the focus bias value at which the C1 error rate becomes 220.
8. Press the YES button and display " [illegible] b = [illegible]".
9. Rotate the AMS knob in the counterclockwise direction and find the focus bias value at which the C1 error rate becomes 220.
10. Press the YES button and display " [illegible] c = [illegible]".
11. Check that the C1 error rate is below 50 and ADER is 00. Then press the YES button.
12. If the "([illegible])" in "[illegible] - [illegible] - [illegible] ([illegible])" is above 20, press the YES button.
    If below 20, press the NO button and repeat the adjustment from step 2 again.
13. Press the NO button and press the EJECT button to remove the continuously recorded disc.

Note 1: The relation between the C1 error and focus bias is as shown in the following figure. Find points a and b in the following figure using the above adjustment. The focal point position C is automatically calculated from points a and b.

Note 2: As the C1 error rate changes, perform the adjustment using the average vale.



5-9. Error Rate Check

5-9-1. CD Error Rate Check

Checking Method :

1. Load a test disc TDYS-1.
2. Rotate the AMS knob and display "CPLAY MODE".
3. Press the YES button twice and display "CPLAY MID".
4. "C1 = [illegible] AD = [illegible]" is displayed.
5. Check that the C1 error rate is below 20.
6. Press the NO button, stop playback, press the EJECT button, and remove the test disc.

5-9-2. MO Error Rate Check

Checking Method :

1. Load a continuously recorded disc (Refer to "5-4. Creating MO Continuously Recorded Disc".).
2. Rotate the AMS knob and display "CPLAY MODE".
3. Press the YES button twice and display "CPLAY MID".
4. "C1 = [illegible] AD = [illegible]" is displayed.
5. If the C1 error rate is below 50, check that ADER is 00.
6. Press the NO button, stop playback, press the EJECT button, and remove the continuously recorded disc.

5-10. Focus Bias Check

Change the focus bias and check the focus tolerance amount.

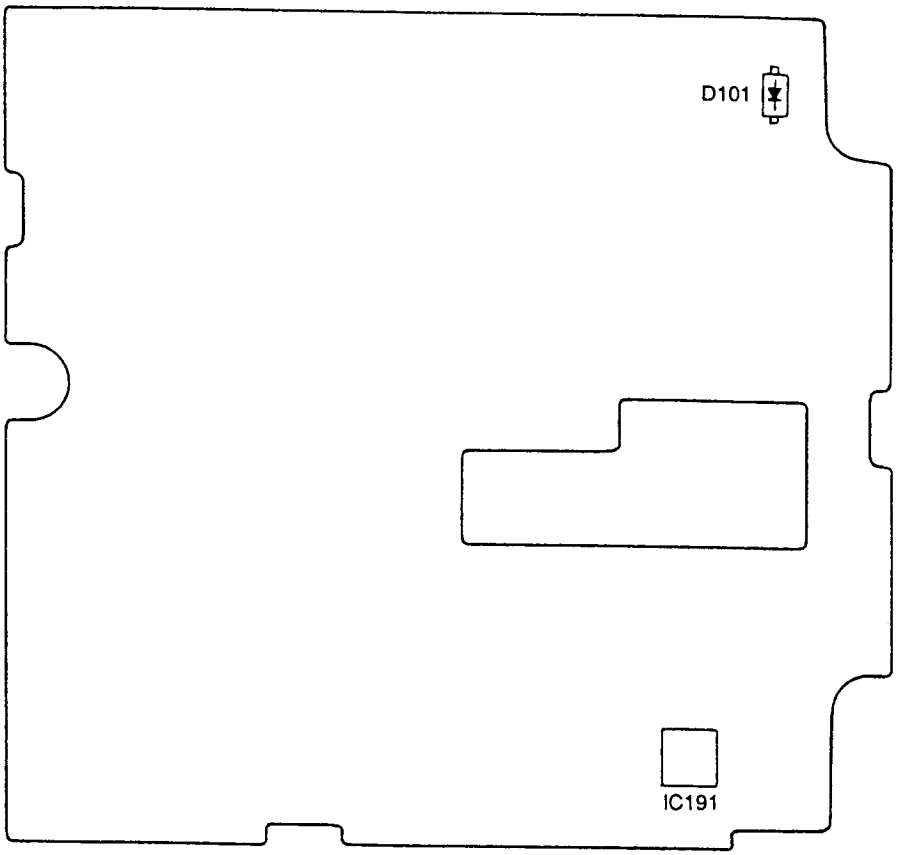
Checking Method :

1. Load a continuously recorded disc (Refer to "5-4. Creating MO Continuously Recorded Disc".).
2. Rotate the AMS knob and display "CPLAY MODE".
3. Press the YES button twice and display "CPLAY MID".
4. Press the NO button when "C1 = [illegible] AD = [illegible]" is displayed.
5. Rotate the AMS knob and display "FBIAS CHECK".
6. Press the YES button and display " [illegible] c = [illegible]".
   The first four digits indicate the C1 error rate, the two digits after [/] indicate ADER, and the 2 digits after [c =] indicate the focus bias value.
   Check that the C1 error is below 50 and ADER is 00.
7. Press the YES button and display " [illegible] b = [illegible]".
   Check that the C1 error is not below 220 and ADER is not above 00 every time.
8. Press the YES button and display " [illegible] a = [illegible]".
   Check that the C1 error is not below 220 and ADER is not above 00 every time.
9. Press the NO button, next press the EJECT button, and remove the continuously recorded disc.

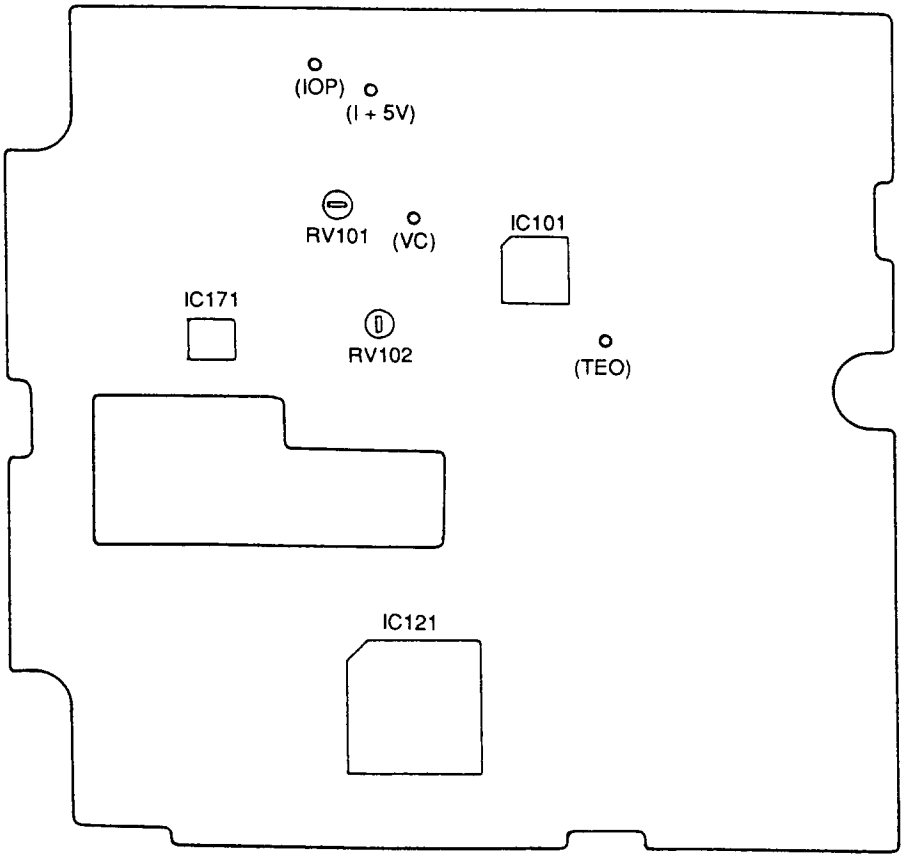
Note 1: If the C1 error and ADER are above 00 at points a or b, the focus bias adjustment may not have been carried out properly. Adjust perform the beginning again.

5-11. Adjusting Points and Connecting Points

[BD BOARD] (COMPONENT SIDE)

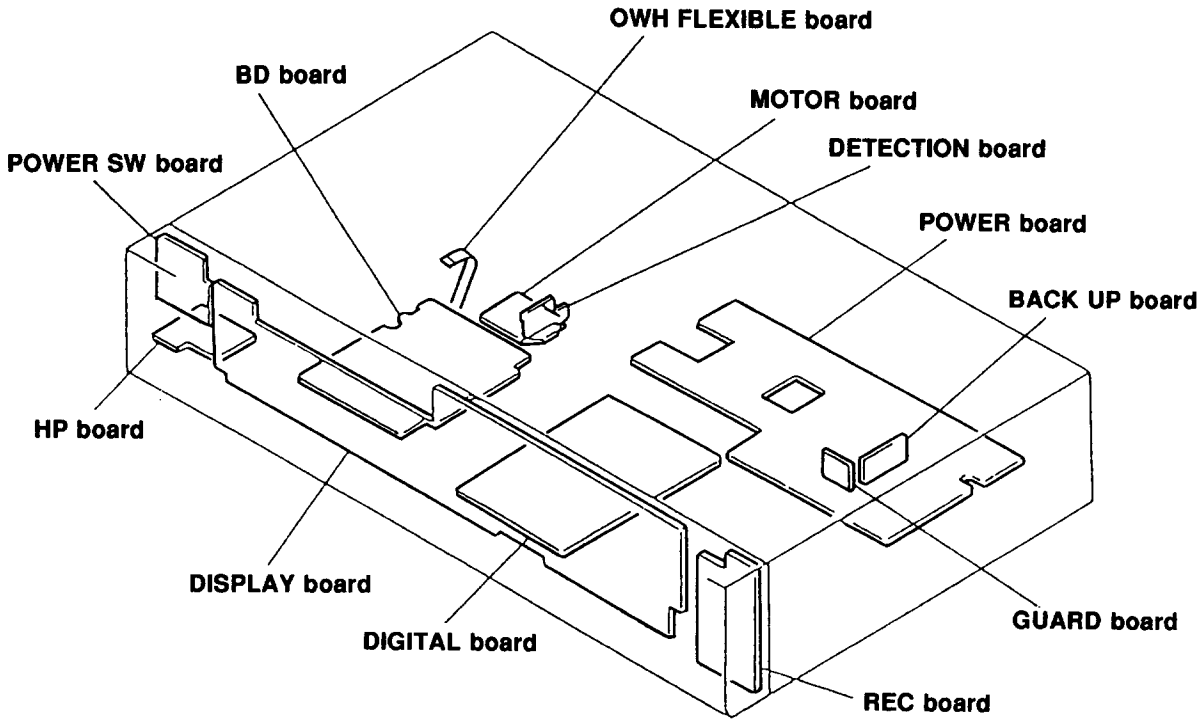


[BD BOARD] (CONDUCTOR SIDE)

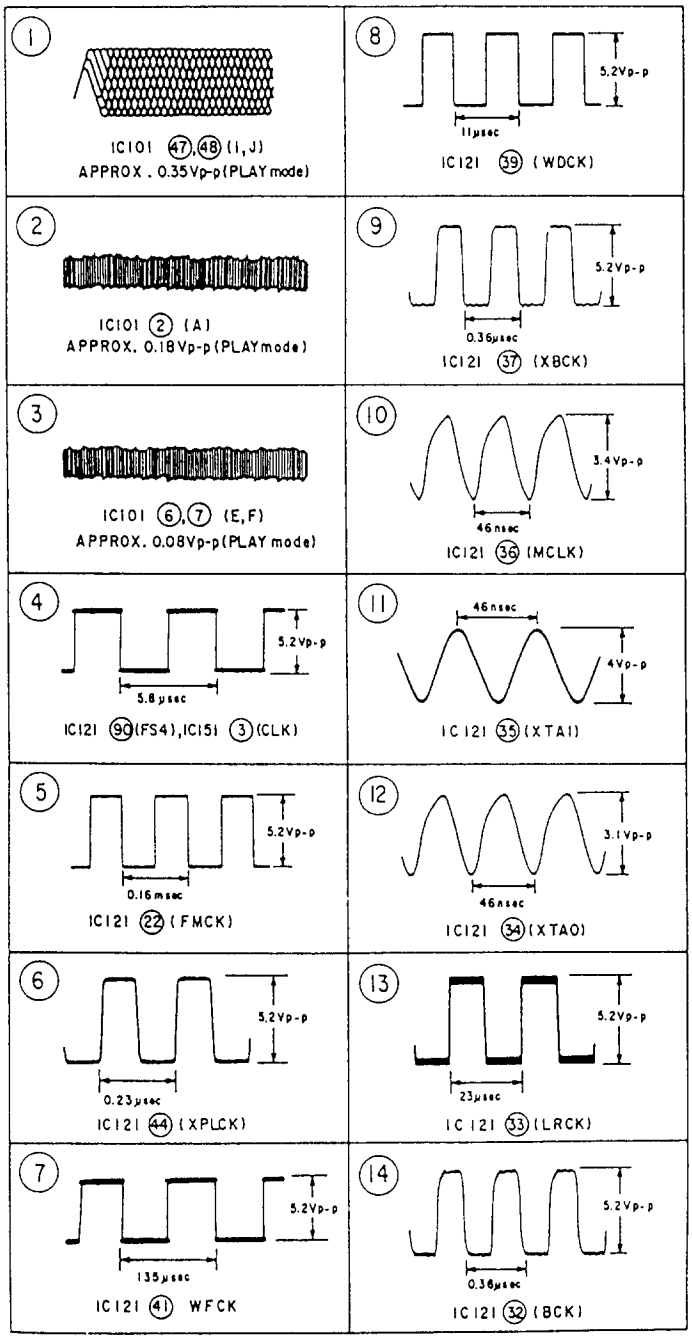


SECTION 6
DIAGRAMS

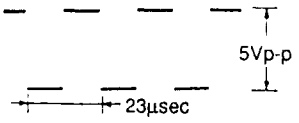
6-1. CIRCUIT BOARDS LOCATION



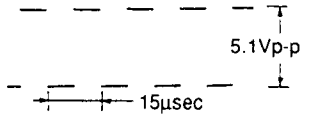
• **Waveforms**


1
IC101 47,48 (I,J)
APPROX. 0.35Vp-p(PLAY mode)
2
IC101 2 (A)
APPROX. 0.18Vp-p(PLAY mode)
3
IC101 6,7 (E,F)
APPROX. 0.08Vp-p(PLAY mode)
4
5.2Vp-p
5.8μsec
IC121 90(FS4),IC151 3(CLK)
5
5.2Vp-p
0.16msec
IC121 22 (FMCK)
6
5.2Vp-p
0.23μsec
IC121 44 (XPLCK)
7
5.2Vp-p
135μsec
IC121 41 WFCK
8
5.2Vp-p
11μsec
IC121 39 (WDCK)
9
5.2Vp-p
0.36μsec
IC121 37 (XBCK)
10
3.4Vp-p
46nsec
IC121 36 (MCLK)
11
46nsec
4Vp-p
IC121 35 (XTAI)
12
3.1Vp-p
46nsec
IC121 34 (XTAO)
13
5.2Vp-p
23μsec
IC121 33 (LRCK)
14
5.2Vp-p
0.36μsec
IC121 32 (BCK)

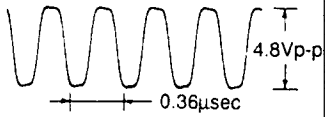
• **Waveforms**

① 

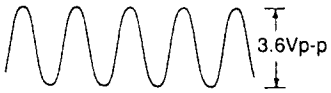
IC301 ⑭ LRCK, IC341 ⑫ LRCK,
IC501 ㉜ LRCKO, IC502 ⑪ AVOCK

② 

IC502 ㉒ LRCK

③ 

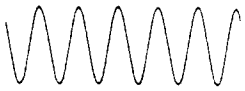
IC301 ⑮ SCLK, IC341 ⑩ XBCK,
IC501 ㉛ BCKO

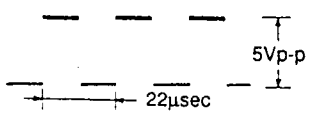
④ 

8.4MHz
IC301 ⑳ MCLK

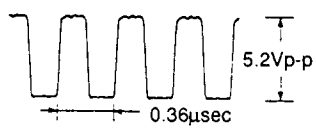
⑤ 
5.6Vp-p 22.579MHz
IC341 ㉑ XOUT

⑥ 
4.8Vp-p 32.768kHz
IC201 ㉔ XOUT

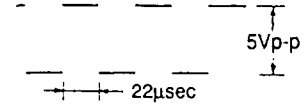
⑦ 
4.2Vp-p 16MHz
IC201 ㉗ XOUT

⑧ 

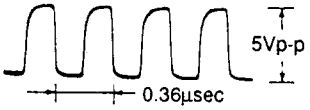
IC271 ㉚ LRCK

⑨ 

IC271 ㉛ BCK

⑩ 

IC271 ㊹ ALRCK

⑪ 

IC271 ㊸ ABCK

ctor side.

able seeing.
not indicated.)

6-12. IC PIN FUNCTIONS

- **IC101 RF Amplifier (CXA1981AR)**

Pin No.	Pin Name	I/O	Function
1	VC	O	Middle point voltage (2.5V) generation output pin
2 to 7	A to F	I	Input of signal from optical block detector
8	FI	I	F operation amplifier input
9	FO	O	F operation amplifier output
10	PD	I	Front monitor. Connected to photo diode
11	APCREF	I	Input pin for setting laser power
12	TEMPI	I	Temperature sensor connection pin
13	GND	–	Ground pin
14	AAPC	O	APC LD amplifier output pin
15	DAPC	O	Not used (Opened)
16	TEMPR	O	Temperature sensor reference voltage output pin
17	XRST	I	Input of reset signal from system controller (IC201). Reset: "L"
18	SWDT	I	Input of write data signal from system controller (IC201)
19	SCLK	I	Input of clock signal from system controller (IC201)
20	XLAT	I	Input of latch signal from system controller (IC201)
21	VREF	O	Reference voltage output. Not used in this unit (Opened)
22	TENV	O	Not used (Opened)
23	THLD	I	Not used (Connected to VC)
24	VCC	–	Power supply pin (+5V)
25	TFIL	I	Not used (Opened)
26	TE	O	Output of tracking error signal to CXD2535BR (IC121)
27	TLB	I	Input pin of add signal to tracking error
28	CSLED	I	Sled error LPF pin
29	SE	O	Output of sled error signal to CXD2535BR (IC121)
30	ADFM	O	ADIP FM signal output
31	ADIN	I	Inputs ADIP FM signal by AC coupling
32	ADAGC	I	Connection pin of external capacitor for ADIP AGC
33	ADFG	O	Output of ADIP dual FM signal to CXD2535BR (IC121) (22.05 kHz ± 1 kHz)
34	AUX	O	Output of auxiliary signal to CXD2535BR (IC121)
35	FE	O	Output of focus error signal to CXD2535BR (IC121)
36	FLB	I	Not used (Opened)
37	ABCD	O	Output of light amount signal to CXD2535BR (IC121)
38	BOTM	O	Output of bottom hold signal of light amount signal to CXD2535BR (IC121)
39	PEAK	O	Output of peak hold signal of light amount signal to CXD2535BR (IC121)
40	RFAGC	I	Connection pin of RF AGC circuit external capacitor
41	RF	O	Output of playback EFM RF signal to CXD2535BR (IC121)
42	ISET	I	Internal circuit constant setting pin. 22 kHz BPF center frequency
43	AGCT	I	Inputs RF signal by AC coupling
44	RFO	O	Output pin of RF signal
45	MORFI	I	Inputs MO RF signal by AC coupling
46	MORFO	O	Output pin of MO RF signal
47, 48	I, J	I	Input of signal from optical block detector

- **IC121 Digital signal processor, digital servo processor, EFM/ACIRC encoder/decoder (CXD2535BR)**

Pin No.	Pin Name	I/O	Function
1	FS256	O	11.2896 MHz clock output (MCLK). Not used in this unit (Opened)
2	FOK	O	Output of FOK signal to system controller (IC201) Outputs "H" when focus is set
3	DFCT	O	Outputs defect ON/OFF switching signal to CXD2536AR (IC271)
4	SHCK	O	Outputs track jump detection signal to system controller (IC201)
5	SHCKEN	I	Track jump detection enable input. Not used in this unit. (Fixed at "H" in this unit.)
6	WRPWR	I	Inputs laser power switching signal from system controller (IC201)
7	DIRC	I	Not used in this unit. (Fixed at "H" in this unit)
8	SWDT	I	Inputs write data signal from system controller (IC201)
9	SCLK	I	Inputs serial clock signal from system controller (IC201)
10	XLAT	I	Inputs serial latch signal from system controller (IC201)
11	SRDT	O	Outputs write data signal to system controller (IC201)
12	SENS	O (3)	Outputs internal status (SENSE) to system controller (IC201)
13	ADSY	O	ADIP sync signal output. Not used in this unit (Opened)
14	SQSY	O	Output subcode Q sync (SCOR) to system controller (IC201) Outputs "L" every 13.3 msec. Outputs "H" at all most mostly
15	DQSY	O	Outputs digital-in U-bit CD format subcode Q sync (SCOR) to system controller (IC201). Outputs "L" every 13.3 msec Outputs "H" at all most mostly
16	XRST	I	Inputs reset signal from system controller (IC201). Reset: "L"
17	TEST4	I	Test input (Fixed at "L")
18	CLVSCK	O	Not used in this unit (Opened)
19	TEST5	I	Test input (Fixed at "L")
20	DOUT	O	Digital audio signal output pin (For optical output)
21	DIN	I	Digital audio signal input pin (For optical input)
22	FMCK	O	ADIP FM demodulation clock signal output
23	ADER	O	ADIP CRC flag output. "H":Error
24	REC	I	Input of recording/playback switching signal from system controller (IC201) Recording: "H". Playback: "L"
25	DVSS	–	Ground pin (Digital)
26	DOVF	I	Digital audio output validity flag input pin. Fixed at "L" in this unit
27	DODT	I	Input pin of 16bit data for digital audio output from CXD2536AR (IC271)
28	DIDT	O	Output pin of 16bit data for digital audio input to CXD2536AR (IC271)
29	DTI	I	Input pin of recording audio data signal from CXD2536AR (IC271)
30	DTO	O (3)	Output pin of playback audio data signal to CXD2536AR (IC271)
31	C2PO	O	Outputs C2PO signal to CXD2536AR (IC271). (Output indicating data error status) Playback: C2PO ("H"). Digital recording: D.In-Vflag. Analog recording: "L"
32	BCK	O	Outputs bit clock signal (2.8224 MHz) to CXD2536AR (IC271) (MCLK)
33	LRCK	O	Outputs L/R clock signal (44.1 kHz) to CXD2536AR (IC271) (MCLK)
34	XTAO	O	System clock (512 fs=22.5792 MHz) signal output. Not used in this unit (Opened)
35	XTAI	I	Input of system clock (512fs=22.5792 MHz) signal input from CXD2536AR (IC271)
36	MCLK	O	MCLK clock (22.5792 MHz) signal output
37	XBCK	O	Pin 32 (BCK) inversion output
38	DVDD	–	Power supply pin (+5V) (Digital)
39	WDCK	O	WDCK clock (88.2 kHz) signal output (MCL)
40	RFCK	O	RFCK clock (7.35 kHz) signal output (MCLK)

Pin No.	Pin Name	I/O	Function
41	WFCK	O	WFCK clock (7.35 kHz) signal output (Playback: EFM decoder PLL. Recording: EFM encoder PLL)
42	GTOP	O	"H": Opens playback EFM frame sync protection window
43	GFS	O	"H": Playback EFM sync and interpolation protection timing match
44	XPLCK	O	EFM decoder PLL clock output (98 fs=4.3218 MHz) Falling edge and EFM signal edge match
45	EFMO	O	EFM signal output (Recording)
46	RAOF	O	Internal RAM overflow detection signal output (decoder monitor output) Outputs "H" when the disc rotation exceeds ± 4F jitter margin during playback
47	MVCI	I	Digital-in PLL oscillation input. Not used in this unit (Fixed at "L" in this unit)
48	TEST2	I	Test pin (Fixed at "L" in this unit)
49	DIPD	O (3)	Digital-in PLL phase comparison output Internal VCO: (Frequency: Low → "H"). External VCO: (Frequency: Low → "L")
50	DVSS	–	Ground pin (Digital)
51	DICV	I (A)	Digital-in PLL internal VCO control voltage input
52	DIFI	I (A)	Filter input when digital-in PLL internal VCO is used
53	DIFO	O (A)	Filter output when digital-in PLL internal VCO is used
54	AVDD	–	Power supply pin (+5V) (Analog)
55	ASYO	O	Playback EFM full-swing output (L=VSS, H=VDD)
56	ASYI	I (A)	Playback EFM asymmetry comparate voltage input
57	BIAS	I (A)	Playback EFM asymmetry circuit constant current input
58	RFI	I (A)	Inputs playback EFM RF signal from CXA1981AR (IC101)
59	AVSS	–	Ground pin (Analog)
60	CLTV	I (A)	Decoder PLL master clock PLL VCO control voltage input
61	PCO	O (3)	Decoder PLL master clock PLL phase comparison output
62	FILI	I (A)	Decoder PLL master clock PLL filter input
63	FILO	O (3)	Decoder PLL master clock PLL filter output
64	PEAK	I (A)	Inputs peak hold signal for light amount signal from CXA1981AR (IC101)
65	BOTM	I (A)	Inputs bottom hold signal for light amount signal from CXA1981AR (IC101)
66	ABCD	I (A)	Light amount signal from CXA1981AR (IC101)
67	FE	I (A)	Input of focus error signal from CXA1981AR (IC101)
68	AUX1	I (A)	Input of auxiliary signal from CXA1981AR (IC101)
69	VC	I (A)	Input of middle point voltage (+2.5V) from CXA1981AR (IC101)
70	ADIO	O (A)	A/D converter input signal monitor output
71	TEST3	I (A)	Test input (Fixed at "L")
72	AVDD	–	Power supply pin (+5V) (Analog)
73	ADRT	I (A)	A/D converter operation range upper limit voltage input (Fixed at "H" in this unit.)
74	ADRB	I (A)	A/D converter operation range lower limit voltage input (Fixed at "L" in this unit.)
75	AVSS	–	Ground pin (Analog)
76	SE	I (A)	Input of sled error signal from CXA1981AR (IC101)
77	TE	I (A)	Input of tracking error signal from CXD1981AR (IC101)
78	AUX2	I (A)	Auxiliary input pin 2. Not used in this unit. (Fixed at "L")
79	DCHG	I (A)	Connected to GND
80	APC	I (A)	Laser APC input. Not used in this unit (Fixed at "L" in this unit)

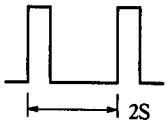
Pin No.	Pin Name	I/O	Function
81	TEST1	I	Test pin (Fixed at "L" in this unit)
82	ADFG	I	Input of ADIP dual FM signal from CXA1981AR (IC101) (22.05 kHz ± 1 kHz) (TTL Schmidt input)
83	TS25	I	Test pin (Fixed at "L" in this unit)
84	LDDR	O	Laser APC signal output
85	TRDR	O	Tracking servo drive signal output (–)
86	TFDR	O	Tracking servo drive signal output (+)
87	FFDR	O	Focus servo drive signal output (+)
88	DVDD	–	Power supply pin (+5V) (Digital)
89	FRDR	O	Focus servo drive signal output (–)
90	FS4	O	176.4 kHz clock signal output (MCLK)
91	SRDR	O	Sled servo drive signal output (–)
92	SFDR	O	Sled servo drive signal output (+)
93	SPRD	O	Spindle servo drive signal output (–)
94	SPFD	O	Spindle servo drive signal output (+)
95	DCLO	O	Not used normally (Opened)
96	DCLI	I	Not used normally (Fixed at "H" in this unit)
97	XDCL	O	Not used normally (Opened)
98	OFTRK	O	Off track signal output
99	COUT	O	Traverse count signal output
100	DVSS	–	Ground pin (Digital)

* (3) of I/O is 3-state output, (A) is analog output.

- **IC201 System Control (RU8X11MF)**

Pin No.	Pin Name	I/O	Function
1	DAOUT 0	O	Test pin. Test mode: C1 signal output
2	DAOUT 1	O	Test pin. Test mode: ADER signal output
3 to 5	KEY 0 to KEY 2	I	Key input (A/D input)*1
6	CHKIN	I	Detection input from the chucking-in switch (S193). When chucking: "L"
7	INSW	I	Detection input from the loading-in switch (S191). When the magnetic head is lowered: "L", others: "H"
8	OUTSW	I	Detection input from the loading-out switch (S192). When loaded out: "L", others: "H"
9	TIMER REC/PLAY	I	Timer recording/playback/OFF switching input. Recording: "H", Playback: "L", OFF: mid-point voltage (+2.5V)
10	SORCE	I	Select signal input from input signals (analog/digital input). Analog input: "L", digital input: "H"
11	AVSS	–	GND (Analog)
12	XINT	I	Interrupt status input from CXD2536AR (IC271)
13	POWER DOWN	I	Power down detection input. Power down: "L"
14	REMOCON	I	Remote control signal input
15	SQSY	I	ATP addressing or subcode Q sync (SCOR) input from CXD2535BR (IC121). "L" is input every 13.3 msec. Normally "H"
16	DQSY	I	Digital-in U-bit CD format subcode Q sync (SCOR) input from CXD2535BR (IC121). "L" is input every 13.3 msec. Normally "H"
17	P15/INT5	O	} Not used (Fixed at "L")
18	P16/INT6	O	
19	LED FS	O	DIGITAL INPUT 44.1 kHz LED (D704) drive signal output
20	SYSTEM RST	I	System reset signal input. "L" is input for several hundreds msec after the power supply activation, then it is changed to "H"
21	TEST	I	Test pin. (Fixed at "L")
22	+5V	–	Power supply (+5V)
23	V BAT	–	Power supply pin to RTC (clock), RAM (+5V)
24	XOUT T	O	Clock output (32.768 kHz) (RTC)
25	XIN T	I	Clock input (32.768 kHz) (RTC)
26	GND	–	GND
27	XOUT	O	Main clock output. (16 MHz)
28	XIN	I	Main clock input. (16 MHz)
29	GND	–	GND
30	S1	O	8MHz clock output
31	DOSEL	O	Digital out selection
32	SENS	I	Internal status (SENSE) input from CXD2535BR (IC121)
33	SHOCK	I	Track jump signal input from CXD2535BR (IC121)
34	$\overline{\text{REC}}$/OTHER	O	Recording: "L", others: "H"
35	F. BIAS/C2	I	Fixed at "L"
36	STB	O	Strobe signal output to the power supply circuit. ON: "H", standby: "L"
37, 38	MIC SW	I	} Not used (Fixed at "L")
39	DIN/$\overline{\text{XTAL}}$	O	
40	PLAY	O	

Pin No.	Pin Name	I/O	Function
41	PAUSE	O	Not used (Fixed at "L")
42	REC	O	
43	LED 0	O	Drive output to POWER ON/STANDBY display LED (D701). Power ON: "H", standby: "L"
44	C1	I	Not used (Fixed at "L")
45	ADER	I	
46	BUS OUT	O	
47	GND	–	GND
48	+5V	–	Power supply (+5V)
49	MASTER/SLAVE	I	Master/slave switching input (Fixed at "H")
50, 51	JOG 1, JOG 0	I	JOG dial pulse input from the rotary encoder (S701)
52	SDA	I/O	Data signal input/output with the backup memory (IC171)
53	SCL	O	Clock signal output to the backup memory (IC171)
54	DFINT	O	Not used (Fixed at "L")
55	DCLAT	O	
56	DFLAT	O	
57	RXD(UART)	I	
58	TXD(UART)	O	
59	RTS(UART)	I	
60	CTS(UART)	O	
61	ERROR	I	Error signal input from the receiver (IC502)
62	D RST36	O	Reset signal output to CXD2536AR (IC271)
63	CLKSET 0	I	Destination selecting pin for clock "H": AEP, German, UK model, "L": US, Canadian model
64	CLKSET 1	I	Destination selecting pin for clock "H": US, Canadian model, "L": AEP, German, UK model
65	GND	–	GND
66	+5V	–	Power supply (+5V)
67	SCLK	O	Clock signal output to the serial bus
68	SWDT	O	Write data signal output to the serial bus
69	SRDT	I	Read data signal input from the serial bus
70	AFAST	I	Not used (Fixed at "L")
71	FLCLK	O	Serial clock signal output to the display driver (IC701)
72	FLDATA	O	Serial data signal output to the display driver (IC701)
73	FLCS	O	Chip select signal output to the display driver (IC701)
74	SLOW	I	Not used (Fixed at "L")
75	LDON	O	Laser ON/OFF control output. "H": Laser ON
76	PIT/GRV	I	Pit/groove detection input. "H" is input for the playback-only disc or TOC area. Not used. (Fixed at "L")
77	FOK	I	FOK signal input from CXD2535BR (IC121). "H" is input when focusing
78	MON	I	Not used. (Pull down when input.)
79	LOCK	O	Not used. (Pull down when output.)
80	WRPWR	O	Laser power switching signal output to the optical pick-up block and CXD2535BR (IC121)
81	DIG RST	O	Reset signal output to CXD1981AR (IC101) and CXD2535BR (IC121) and motor driver (IC151). Reset: "L"
82	BEEP	O	Not used (Fixed at "L")
83	DA RST	O	Reset signal output to the D/A converter (IC341), A/D converter (IC301). Reset: "L"

Pin No.	Pin Name	I/O	Function
84, 85	SCMD 1, SCMD 0	O	Serial command control mode output to CXD2536AR (IC271)
86	MOD	O	Laser modulation switching signal output. Playback power: "L", stop: "H". Recording power: ⟷ 0.5S  2S
87	REC/$\overline{PB}$	O	Record/playback switching signal output to CXD2535BR (IC121). Recording: "H", playback: "L"
88	WR/$\overline{MN}$	O	Write/monitor mode switching signal output to CXD2536AR (IC271)
89	SCTX	O	Write data transfer timing output to CXD2536AR (IC271). Also serves as ON/OFF output of the magnetic head
90	XLATCH	O	Latch signal output to the serial bus
91	DALAT	O	Latch signal output to the D/A converter (IC341)
92	SRCMT	O	Not used (Fixed at "L")
93	AMUTE	O	Line out muting output
94	LDOUT	O	} Loading motor (M191) control output*2
95	LDIN	O	
96	LIMIT IN	I	Detection from the limit-in switch (S101). Sled limit-in: "L"
97	PROTECT	I	Recording-protect claw detection input from the protect detection switch (S102-1). When protected: "H"
98	REFLECT	I	Disc reflection rate detection input from the reflect detection switch (S102-2). Disc with lower reflection rate: "H"
99	GND	–	GND
100	+5V	–	Power supply (+5V)

*1 Key input

Voltage / Pin	0V	0.9V	1.75V	2.5V	3.4V	4.2V	5V
KEY 0, 5 pin	S771 ● REC	S772 ■		S774 ▶▶	S775 ◀◀	S776 EJECT ⏏	No key input
KEY 1, 4 pin	S761 PLAY MODE	S762 REPEAT	S763 SCROLL/ CLOCK SET	S764 POWER			No key input
KEY 2, 3 pin	S751 EDIT NO	S752 YES	S753 ❚❚	S754 ▷	S701 ⏮ AMS ⏭	S756 DISPLAY/ CHARACTER	No key input

*2 Loading motor control

Operation / Pin	IN	OUT	BRAKE
LDIN 95 pin	"H"	"L"	"H"
LDOUT 94 pin	"L"	"H"	"H"

- **IC271 Shock-Proof Memory Controller, ATRAC Encoder/Decoder (CXD2536AR)**

Pin No.	Pin Name	I/O	Function
1	VDD	–	Power supply pin (+5V)
2	SWDT	I	Input of write data signal from system controller (IC201)
3	SCK	I	Input of serial clock signal from system controller (IC201)
4	XLAT	I	Input of serial latch signal from system controller (IC201)
5	SRDT	O/Z	Output of read data signal to system controller (IC201)
6	SENSE	O/Z	Output of internal status (SENSE) to system controller (IC201)
7	SCMD0	I	Input of serial command control mode from system controller (IC201) (Fixed at "H" in this unit)
8	SCMD1	I	
9	XINT	O	Output of interrupt status to system controller (IC201)
10	RCPB	I	Recording/playback switching input. Not used in this unit (Fixed at "L" in this unit)
11	WRMN	I	Input of write/monitor mode switching signal from system controller (IC201)
12	TX	I	Input of write data transmission timing from system controller (IC201) Also used as magnetic field head ON/OFF output
13	VSS	–	Ground pin
14	SICK	I	Chip reservation pin (Fixed at "L" in this unit)
15	IDSL	I	
16	XILT	I	Chip reservation pin (Fixed at "H" in this unit)
17	XRST	I	Input of reset signal from system controller (IC201). Reset: "L"
18 to 21	TS0 to TS3	I	Test pin (Fixed at "L" in this unit)
22	EXIR	I	Chip reservation pin (Fixed at "L" in this unit)
23	SASL	I	Block selection in single use. "L": ATRAC. "H": RAM controller (Fixed at "L" in this unit)
24	SNGLE	I	Normally fixed at "L. Fixed at "H" when used as ATRAC or RAM controller for single. Fixed at "L" in this unit
25	VSS	–	Ground pin
26	AIRCPB	O	Output pin of ATRAC and external audio block recording/playback mode signal. Not used in this unit
27	XRQ	I/O	ATRAC I/F XRQ signal input/output pin. Not used in this unit
28	ADTO	I/O	ATRAC decode data signal input/output pin. Not used in this unit
29	ADTI	I/O	ATRAC encode data signal input/output. Not used in this unit
30	XALT	I/O	ATRAC I/F XALT signal input/output pin. Not used in this unit
31	ACK	I/O	ATRAC I/F ACK signal input/output pin. Not used in this unit
32	AC2	I/O	ATRAC I/F error data signal input/output pin. Not used in this unit
33	LCHST	I/O	ATRAC I/F Lch start data signal input/output pin. Not used in this unit
34	EXE	I/O	ATRAC I/F EXE signal input/output pin. Not used in this unit
35	MUTE	I/O	ATRAC I/F MUTE signal input/output pin. Not used in this unit
36	OSCO	O	Clock output (49.152 MHz)
37	OSCI	I	Clock input (49.152 MHz)
38	VSS	–	Ground pin
39	ATT	I/O	ATRAC I/F ATT signal input/output pin. Not used in this unit
40	F86	O	ATRAC block 11.6 msec timing signal output pin. Not used in this unit
41	DOUT	O	Output of monitor/decode audio data signal to D/A converter (IC341)
42	ADIN	I	Input of recording signal from A/D converter (IC301)
43	ABCK	O	Output of bit clock signal to A/D and D/A converters (IC301, IC341)
44	ALRCK	O	Output of L/R clock to A/D and D/A converters (IC301, IC341)
45 to 47	SA2 to SA0	O	Address signal output. Not used in this unit

Pin No.	Pin Name	I/O	Function
48, 49	A11, A10	O	Address signal output. Not used in this unit
50	VSS	–	Ground pin
51	VDD	–	Power supply pin (+5V)
52 to 55	A03 to A00	O	Output of address signal to RAM (IC272)
56 to 60	A04 to A08	O	Output of address signal to RAM (IC272)
61	XOE	O	Output of output enable control signal to RAM (IC272)
62	XCAS	O	Output of column address strobe signal to RAM (IC272)
63	VSS	–	Ground pin
64	XCS	O	Output of chip select signal to RAM (IC272). Not used in this unit
65	A09	O	Output of address signal to RAM (IC272)
66	XRAS	O	Output of row address strobe signal to RAM (IC272)
67	XWE	O	Output of read/write control signal to RAM (IC272)
68, 69	D1, D0	I/O	Input/output pin of data signal to/from RAM (IC272)
70, 71	D2, D3	I/O	
72 to 74	D4 to D6	I/O	Data signal input/output pin. Not used in this unit
75	VSS	–	Ground pin
76	D7	I/O	Data signal input/output pin. Not used in this unit
77	ERR	I/O	Input/output pin of error (C2PO) data to external RAM. Not used in this unit
78	EXTC2R	I	External RAM selection input for error data writing ("H": External RAM). Fixed at "L" in this unit
79	BUSY	O	RAM access BUSY signal output. Not used in this unit
80	EMP	O	EMPTY or immediately before FULL of ATRAC data (When DSC=ASC+1: "H"). Not used in this unit
81	FUL	O	FULL or immediately before EMPTY of ATRAC data (When ASC=DSC+1: "H"). Not used in this unit
82	EQL	O	ATRAC data EMPTY (When DSC=ASC: "H"). Not used in this unit
83	MDLK	O	Indicates recording/playback data main/sub ("H": Sub, Linking: "L": Main). Not used in this unit
84	CPSY	O	Interpolation sync signal output. Not used in this unit
85	CTMD0	O	DSC counter mode output
86	CTMD1	O	
87	SPO	O	Output of system clock (512fs=22.5792 MHz) signal to CXD2535BR (IC121)
88	VSS	–	Ground pin
89	MDSY	O	Main data sync detection signal output. Not used in this unit
90	LRCK	I	Input of L/R clock signal from CXD2535BR (IC121) (44.1 kHz)
91	BCK	I	Input of bit clock signal from CXD2535BR (IC121) (2.8224 MHz)
92	C2PO	I	Input of C2PO signal from CXD2535BR (IC121) (Shows data error status) Playback:C2PO ("H"). Digital recording: D.In-Vflag. Analog recording: "L"
93	DATA	I/O	Recording:Output of recording audio data signal to CXD2535BR (IC121) Playback:Input of playback audio data signal from CXD2535BR (IC121)
94	DIDT	I	Input of digital audio input 16-bit data from CXD2535BR (IC121)
95	DODT	O	Output of digital audio output 16-bit data to CXD2535BR (IC121)
96	DIRCPB	O	Disc drive and EFM encoder/decoder recording/playback mode output. Not used in this unit
97	MIN	I	Input of defect ON/OFF switching signal from CXD2535BR (IC121)
98	SPOSL	I	Pin 87 (SPO) input/output switching input pin ("L":IN. "H":OUT). Fixed at "H" in this unit
99	MCK	O	RAM controller internal master clock output pin. Not used in this unit
100	VSS	–	Ground pin

- **IC301 A/D Converter (CXD8566M)**

Pin No.	Pin Name	I/O	Function
1	INLP	I	Lch analog (+) input
2	INLM	I	Lch analog (–) input
3	REFI	I	Reference voltage input (+3.2V)
4	AVDD	–	Modulator analog power supply (+5V)
5	AVss	–	Modulator analog GND
6	ANAPD	I	Modulator power down. "H": Normal operation, "L": Power down. (Fixed at "H")
7	HPBYP	I	Test pin. (Fixed at "L")
8	MODE2	I	Mode setting. (Fixed at "L")
9	OSFL	O	Lch overflow flag output (Not used) (opened)
10	DIGPD	I	Decimation filter power down. "H": Normal operation, "L": Power down/reset
11	TEST	I	Test pin. (Fixed at "L")
12	CMODE	I	Master clock selection. "H": 384fs, "L": 256fs. (Fixed at "L")
13	MODE0	I	Mode setting. (Fixed at "L")
14	LRCK	I/O	Master mode: LRCK output, slave mode: LRCK input
15	SCLK	I/O	Master mode: BCK output, slave mode: BCK input
16	DOUT	O	DATA output
17	FSYNC	I/O	Master mode: FSYNC output, slave mode: FSYNC input
18	DVDD	–	Decimation filter power supply (+5V)
19	DVss	–	Decimation filter GND
20	MCLK	I	Master clock input (256fs)
21	OSFR	O	Rch overflow flag output (Not used) (opened)
22	MODE1	I	Mode setting. (Fixed at "L")
23	NC	–	Not used (opened)
24	VLOGIC	–	Modulator logic power supply (+5V)
25	LGND	–	Modulator logic GND
26	REFO	O	Reference voltage output
27	INRM	I	Rch analog (–) input
28	INRP	I	Rch analog (+) input

• **IC501 Sampling Rate Converter (CXD8517Q)**

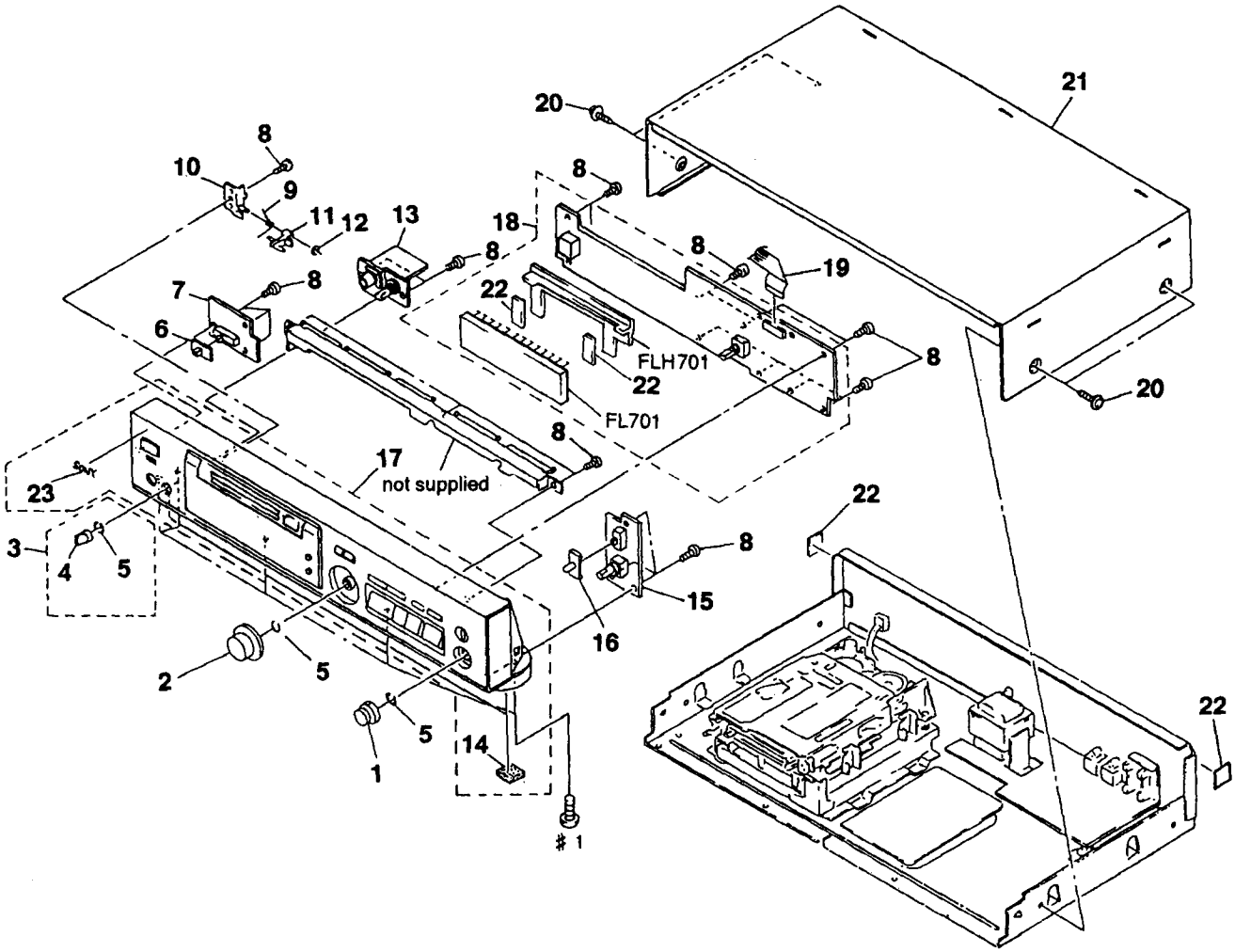
Pin No.	Pin Name	I/O	Function
1	DATAI	I	Data input
2	LRCKI	I	Input data fs word clock input (Schemidt)
3	BCKI	I	Input data bit clock input
4	MI0	I	Input data format setting input 0
5	MI1	I	Input data format setting input 1
6	VDD	–	+5V power supply
7	FI128	I	Input data fs reference clock input (512fs, 384fs, 256fs, 128fs)
8	MO0	I	Output data format setting input 0 (fixed at "L")
9	MO1	I	Output data format setting input 1 (fixed at "L")
10	INIT	I	Initializing input (Schmidt). "L": Initializing, "H": Normal operation
11	NC	–	Not used. (open)
12	GND	–	GND
13	XI	I	Inverter input for oscillating the crystal oscillator (512fo master clock input)
14	XO	O	Inverter output for oscillating the crystal oscillator (not used) (open)
15	VDD	–	+5V power supply
16	XO2	O	Oscillation clock division output: 256fs (not used) (open)
17	GND	–	GND
18	PASS	I	Input data through output mode setting input. "L": Normal operation, "H": Through (When through: Effective operation output only for deemphasis, attenuation) (fixed at "L")
19	FIS0	I	FI128 clock input division ratio setting input (fixed at "L")
20	FIS1	I	FI128 clock input division ratio setting input (fixed at "L")
21	TEST	O	Test input 0 (not used) (open)
22	NC	–	} Not used (open)
23	NC	–	
24	TEST1	I	Test input 1 (fixed at "L")
25	TEST2	I	Test input 2 (fixed at "L")
26	TEST3	I	Test input 3 (fixed at "L")
27	STA	O	fs conversion ratio measurement condition monitor output (not used) (open)
28	VDD	–	+5V power supply
29	NC	–	Not used (open)
30	DATAO	O	Data output (fso output)
31	BCKO	I/O	Output data bit clock input/output
32	LRCKO	I/O	Output data fs word clock input/output
33	NC	–	} Not used (open)
34	NC	–	
35	MUTE	I	Data output mute setting input. "L": Mute, "H": Normal operation Synchronized with LRCK ("0" data only for DATAO output) (fixed at "H")
36	DEMP	I	Deemphasis setting input. "L": OFF, "H": ON (fixed at "L")
37	FS1	I	Deemphasis setting output fso frequency selection input 1 (fixed at "L")
38	FS2	I	Deemphasis setting output fso frequency selection input 2 (fixed at "L")
39	GND	–	GND
40	XLAT	I	Attenuation, mode setting data latch pulse input
41	SCK	I	Attenuation, mode setting clock input
42	SWDT	I	Attenuation, mode setting data input
43	SLAVE	I	Sync mode selection. "L": Slave, "H": Master (fixed at "L")
44	NC	–	Not used (open)

- **IC502 Digital Audio Interface Receiver (CXD8521M)**

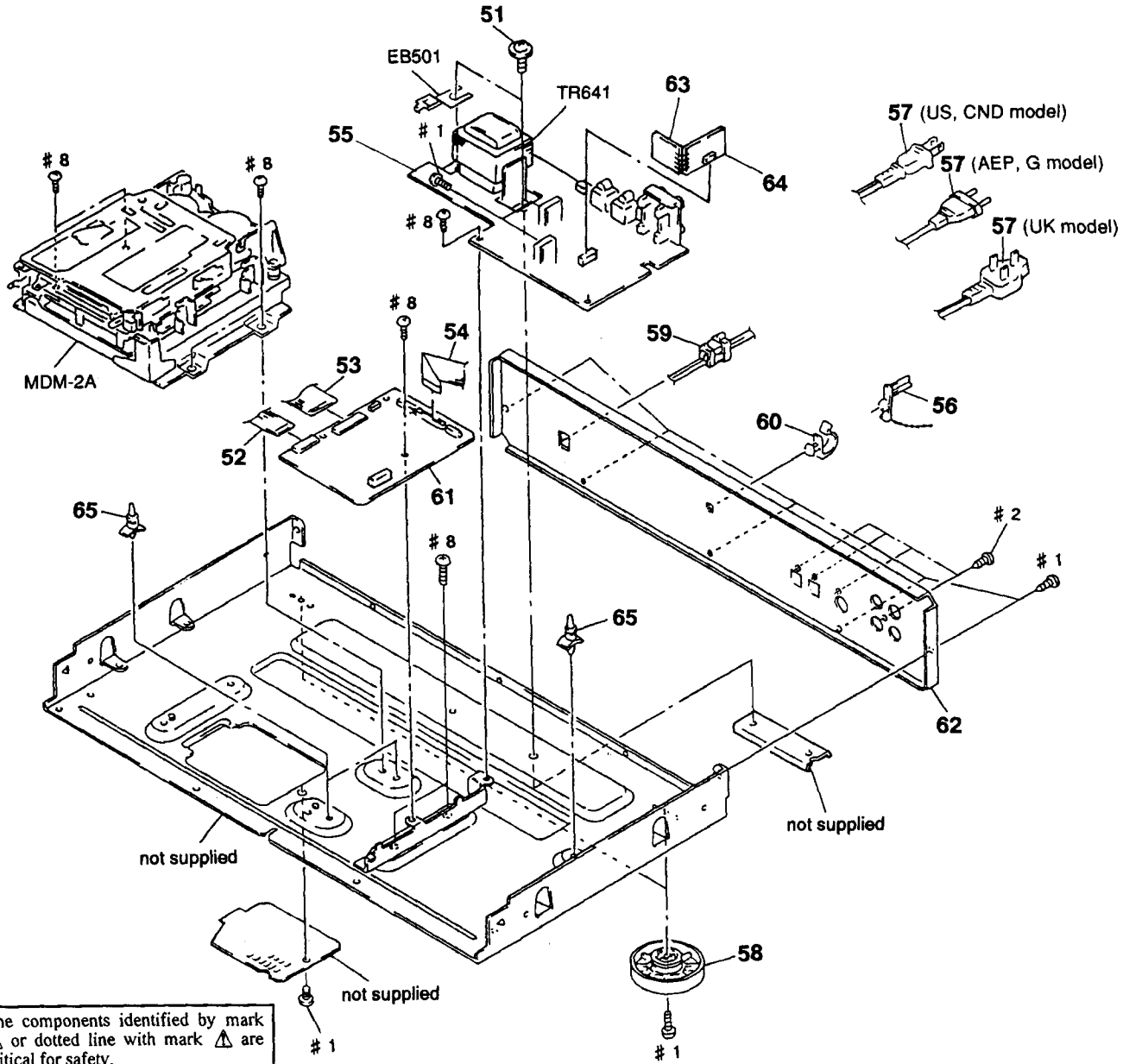
Pin No.	Pin Name	I/O	Function
1	DIN1	I	Data input pin with built-in amplifier (responding to the coaxial optical module)
2	DIN2	I	Data input (responding to the optical module)
3	E/DOUT	O	Emphasis, input bi-phase, validity flag output
4	V_{DD}	–	Power supply (+5V)
5	R	I	VCO gain control input (Fixed at "H")
6	VIN	I	VCO freerunning frequency setting input
7	VCO	O	LPF setting of PLL (Fixed at "H")
8	GND	–	GND
9	CKSEL	I	System clock select input (384fs, 512fs) (Connected to the power supply.)
10	XMODE	I	Reset input
11	AVOCK	I	Clock input for preventing PLL lock failure
12	TST1	I	Test input (Normally "L")
13	TST2	I	
14	SCLK	I	Microcomputer IF clock input
15	XLAT	I	Microcomputer IF latch/chip enable input
16	SWDT	I	Microcomputer IF write data input
17	SRDT	O	Microcomputer IF read data output
18	DQSY	O	Microcomputer IF Sub-Q sync and ID sync output
19	CKOUT	O	VCO clock output (freerunning, 384fs, 512fs) (Not used) (opened)
20	FS128	O	128fs clock output
21	BCK	O	Bit clock output
22	LRCK	O	L/R clock output
23	DATAO	O	Audio data output
24	EROR	O	PLL lock error mute output

7-1. CASE AND FRONT PANEL SECTION

Ne les remplacer que par une piéce portant le numéro spécifié.



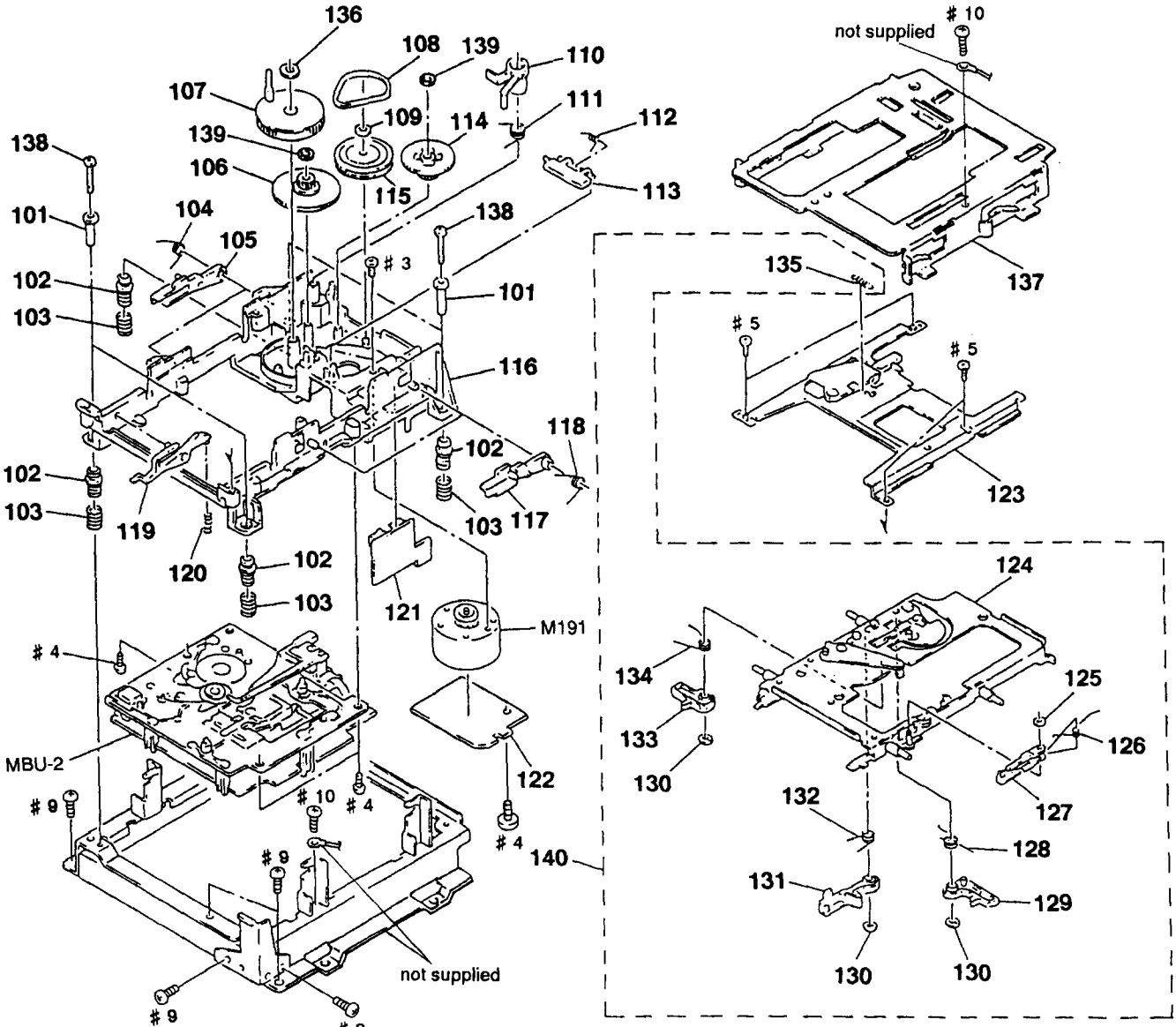
7-2. CHASSIS SECTION



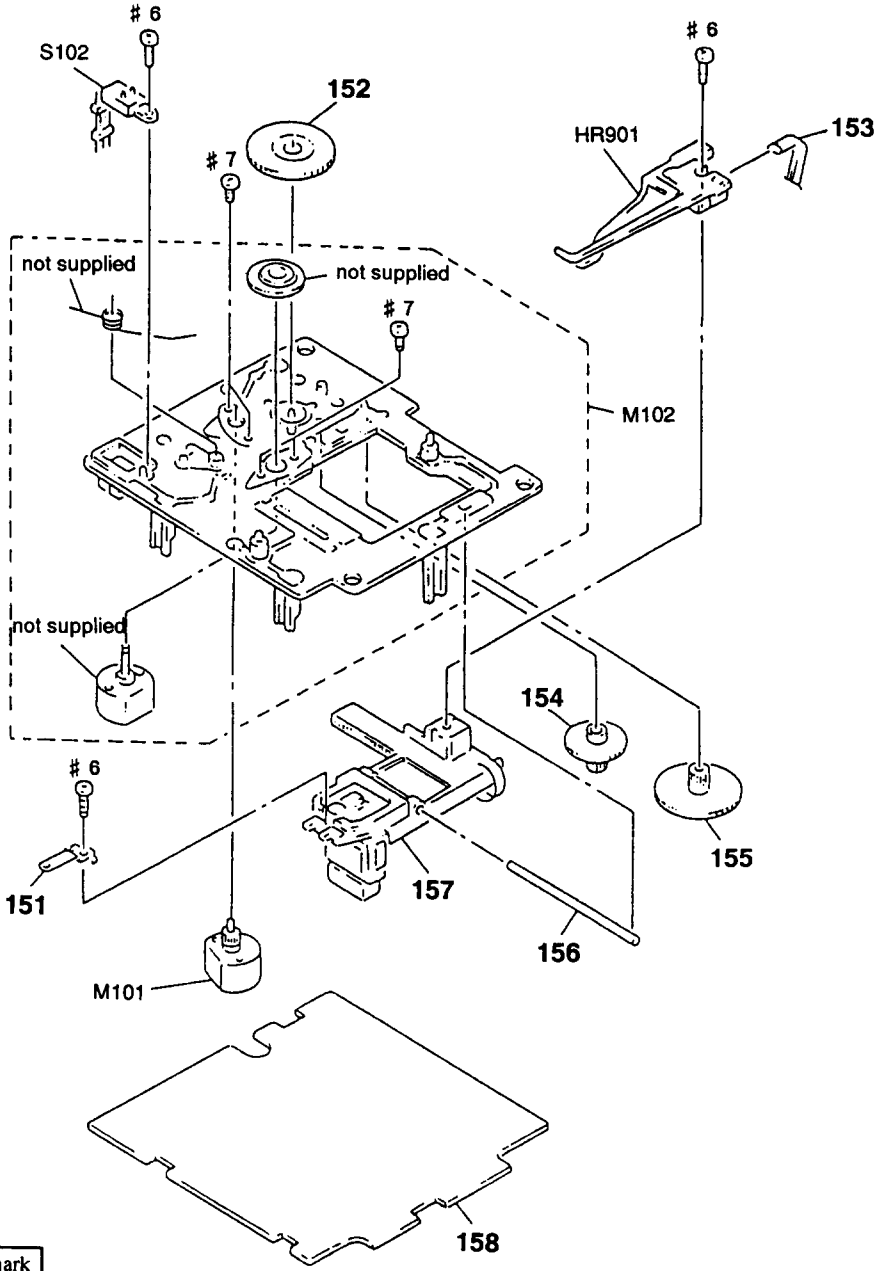
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une piéce portant le numéro spécifié.

7-3. MECHANISM DECK SECTION (MDM-2A)



7-4. BASE UNIT SECTION (MBU-2)



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